THE RAILWAY GAZETTE
A Journal of Management, Engineering and Operation
INCORPORATING
Railway Engineer · TRANSPORT · The Railway News
The Railway Times · Herapath's Railway Journal · RAILWAY RECORD.
RAILWAYS ILLUSTRATED · ESTABLISHED 1835 · Railway Official Gazette

PUBLISHED EVERY FRIDAY
AT
33, TOTHILL STREET, WESTMINSTER, LONDON, S.W.1

Telegraphic Address: "TRAZETTE PARL., LONDON"
Telephone No.: WHITEHALL 9233 (12 lines)

Annual subscription payable in advance and postage free
British Isles and Abroad .....£2 5s. 0d.
Single Copies .....One Shilling
Registered at the General Post Office, London, as a Newspaper

VOL. 87 No. 10 FRIDAY, SEPTEMBER 5, 1947

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DIESEL RAILWAY TRACTION

The September issue of this RAILWAY GAZETTE *Publication, illustrating and describing developments in Diesel Railway Traction, is now ready, price* 2s.

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THE RAILWAY GAZETTE
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The F.B.I. on the Way to Recovery

THE General Council of the Federation of British Industries in a memorandum addressed to the Prime Minister has made a constructive commentary on the economic crisis, and has stated in blunt terms the steps which, in its considered judgment, must be taken to ensure recovery. It points out that action against inflation is of importance equal to the attempt to balance external payment, and it stresses the need for a cut of £450 million in the Government capital programme, parallel reductions in private spending, and a drastic review of current Government expenditure involving a curtailment of Government staffs. If higher taxes are needed to counteract the inflationary trend, it favours indirect, rather than direct taxation. The important point is made in the memorandum that there is but one way out of the present dilemma—the restoration of our credit with the rest of the world. If this were a matter only of gold and exchange, in the short term the task would be impossible, but even more, credit is a matter of prestige and confidence. It is essential, therefore, to start the processes which will earn not only respect of the world, but also set in motion helpful economic influences.

* * * *

Mr. A. E. Tattersall

Mr. A. E. Tattersall, who, as already announced, is retiring from the position of Assistant Chief Engineer (Signals), L.N.E.R., has served, in addition to that railway, no fewer than four pre-amalgamation systems—the Lancashire & Yorkshire, Great Southern & Western (Ireland), Metropolitan and Great Northern Railways, the widely-varying operating conditions of which afforded scope for gaining considerable experience. On the Metropolitan, where he was associated with the great change necessitated by electrification, Mr. Tattersall acquired that enthusiasm for the adoption of new methods which has been evident in all his subsequent work. Greatly interested in the scientific side of his profession, he has sought constantly to make its importance appreciated and enhance the respect felt for it by engineers engaged in other branches of railway engineering. He has taken also a keen interest in the promotion of technical education for the railway service. Although some signal engineers may not share his views on certain controversial points, all will admit that he has been animated by a most progressive spirit, and has never lacked courage, either in putting his convictions to the test of practical service, or in defending them in discussion. A portrait and biography of Mr. Tattersall appear elsewhere in this issue.

* * * *

Workers' Control of Railways

A measure of control coupled with the sense of working for the community is claimed as one of the attractions of employment in a nationalised industry. We publish elsewhere a review of a booklet by Mr. James Jary in which means of exercising such control on railways are suggested. His proposals are based on a system of committees, widely representative and sufficiently large to sustain the protracted discussions which in recent months have been made familiar to the public as necessary preludes to administrative action in a State-owned industry. Although since the booklet went to press Mr. Herbert Morrison has described talk about incentives as "bunk," prospects of easier promotion are held out to readers. Qualifications will include evidence of trade union activity, and apparently it is assumed that workers' control will be able to stave off the introduction of highly competitive examinations such as those by which entry is gained to administrative posts in the Civil Service. Some closing remarks indirectly applaud the proposed committees by saying that workers' control will protect railway officers from "slavish adherence to the whims and fancies of their immediate superiors." But why should not the directives of bulky committees be equally whimsical and fanciful, or even incoherent?

* * * *

The State of Mysore

The Mysore State Railway, though it has a route-mileage of little more than 700, is a Class 1 system owned and worked by the sovereign Indian State of that name. Situated on the central plateau of Southern India, Mysore is a constitutional

monarchy, the Maharjah being an enlightened prince and his Government thoroughly democratic. Its chief exports are rice, wheat, maize, coffee, oil seeds, timber, gold, and sandalwood oil, the basis of most perfumes. Unlike most Indian cities, Mysore, the capital, is clean, well laid-out, and brilliantly lit. Abundant electric current is available throughout much of the State from hydro-electric plants on the Cauvery and other rivers. The largest and most important city is Bangalore, which is a large centre of trade and commerce. It is, moreover, an important railway junction, with lines radiating in all directions, as may be seen from the map accompanying an article on the Mysore State Railway on page 261. The State has an excellent road network, and in it is the famous Kolar goldfield. In addition to further hydro-electric extensions, a £7¼-million irrigation project is just being launched by this enterprising State, the total area of which is about 28,000 sq. miles.

* * * *

Overseas Railway Traffics

The improved tendency in Argentine railway receipts, noted a fortnight ago, has been maintained. Publication of returns by the Buenos Ayres & Pacific Railway has been resumed, and in the two weeks ended August 23 this company showed a gain of ps. 1,175,000. On the Buenos Ayres Great Southern the advance has been ps. 553,000, and on the Buenos Ayres Western ps. 153,000. Central Argentine traffics have recorded an improvement of ps. 589,950 in the same period. Although the two weeks of the fortnight under review brought better traffics to the Entre Rios Railways, that company's aggregate for eight weeks is ps. 19,100 behind last year. Similarly, Argentine North Eastern aggregate results have experienced a setback on aggregate of ps. 64,200 despite a combined increase of ps. 71,400 in the two weeks. Some figures for the fortnight are compared below:—

	No. of week	Weekly traffic	Inc. or dec.	Aggregate traffic	Inc. or dec.
Buenos Ayres & Pacific* ...	8	2,625	+600	19,175	+2,162
Buenos Ayres Great Southern*	8	3,432	+265	26,481	+278
Buenos Ayres Western* ...	8	1,355	+6	10,392	+981
Central Argentine* ...	8				
		£	£	£	£
Canadian Pacific	33	1,481,750	+82,250	49,145,250	+4,049,750

* Traffic returns in thousands of pesos

Canadian National gross earnings for July were £896,000 higher, but increased working expenses resulted in the net result being reduced by £225,250.

* * * *

Engineers Urged to Revitalise the World

The 75th annual convention of the American Society of Civil Engineers was held at Duluth, Minn., from July 18-20. Mr. E. M. Hastings, President for the current year, addressed the opening session of representatives of the 22,000 members of the society. He urged engineers not to confine their activities to purely technical work and ideas, but to widen their scope and assume leadership in national and world affairs by providing the non-political, unbiassed, factual and analytical thinking of which they were capable. They should apply their talents to the many and great tasks now presented by democracy, without waiting for the politicians and diplomats to solve the relevant problems. In fact, he expressed the view that it was essential for the creative mind of the engineer to be used in revitalising the world, if the present almost universal confusion was to be dispelled. It was not necessary to dally with power politics before laying the foundations of a new and better world immune from the threat of dire destruction even on the scale of that caused in the recent war.

* * * *

"Devon Belle" Popularity

Experience in several countries has shown that additional comfort attracts traffic as effectively as high speed. In post-war Britain the facility of reserving seats is in itself a powerful inducement to patronise trains where this is possible, and when coupled with reconditioned Pullman stock and an observation car, as in the "Devon Belle" of the Southern Railway, has proved a notable success. Elsewhere in this issue we reproduce two photographs taken in the observation car during a journey, from which it may be judged how well the new vehicle enables the scenery of the Southern Railway route to the West to be enjoyed. We described the train in our June 27 and July 4 issues, and recorded on the latter occasion that already the train was booked up fully on Saturdays until the end of August. A further indication of popularity is the experience of a family of five travelling on August 30—the first date on which the seats they required were available, although they had booked in the middle of June. The train runs on Mondays, Fridays, Saturdays, and Sundays, and the demand for accommodation on the two latter days has been particularly heavy.

* * * *

Fastest Schedule on Record, Chicago-New York

This summer the New York Central System has made a cut in the timing of the eastbound "Twentieth Century Limited" that has introduced the fastest schedule ever yet tabled between Chicago and New York. This direction, rather than the westbound, has been chosen because eastbound services lose an hour in changing from Central to Eastern Time, whereas westbound trains gain an hour. The westbound "Century" remains on its 16-hr. timing, therefore, but the eastbound train has come down to 15½ hr., which entails an overall speed for the 958 miles, all stops included, of 61·8 m.p.h. The "Twentieth Century" is one of the long-distance expresses which the New York Central has changed over to diesel-electric power, and now, perhaps even more significantly, the Pennsylvania Railroad, foremost of all American lines in the technical development of the steam locomotive, has turned over its competing "Broadway Limited" also to diesel haulage between Harrisburg, at the end of the electrified line from New York, and Chicago. At one time both the "Twentieth Century" and the "Broadway" moved exactly in step in the matter of their overall timings, and this is the first occasion that one train has been accelerated without the other.

* * * *

The Gidea Park Collision

The serious collision at Gidea Park, L.N.E.R., on January 2, was due to passing a number of signals in a bad fog; the driver, who had lost his whereabouts, continuing to travel at considerable speed for some distance without seeing any signal, until he ran into the other train, just starting from the station. Lt.-Colonel E. Woodhouse, whose report is summarised elsewhere, considers that the driver "showed a regrettable lack of caution by continuing to travel at a speed that was manifestly too high." There seems little doubt that the fogman allocated to the Romford distant signals, whose evidence is described as "far from satisfactory," gave no warning to the train, even if he did reach his post in time to do it, and that this, coupled with the Romford outer home being seen by the fireman to be "off" on coming into view, may have given the driver a false impression. Colour-light signals, emergency detonator-placers, and automatic train control all find mention in the report, and the immediate provision of the second item at boxes in the area as yet unprovided with them is recommended. In Great Eastern days, many signals near London, especially outer homes, junction homes, and advanced starting signals, had detonator-placers working with them, and the traffic officers thought highly of that safeguard.

* * * *

The Ever-Present Fog Difficulty

Fog always has been a great nuisance to our railways, much more so than to those in most other countries, and constitutes a source of danger for which there is no reasonably complete remedy short of installing new or additional equipment, giving some measure of automatic train control. The detonator system, of necessity, is based on a wrong principle, the absence of a warning amounting, if not to an actual indication that the line is clear, at least to an encouragement to assume it to be so. This weakness is felt most when fog descends suddenly, or is met with in shifting patches, and there is considerable risk of fog posts remaining unmanned for a time. If a driver receives a wrong impression from this cause, and perhaps is inclined to take a chance in addition, a very serious situation quickly can be brought about, and indeed we are fortunate in having as few accidents in fog as we do. Colour-light signals admittedly can be a great help in fog but, as Colonel Woodhouse points out, even they have been missed at times. Some form of A.T.C., always on duty and not subject to the un-

certainties of present methods, alone can provide a definite safeguard against such mistakes as were made at Gidea Park.

* * * *

Cleaning Fires en route in India

Because of the length of many runs in India, and also of the comparatively poor quality of the coal, opportunity must be taken by engine crews during certain stops to clean the fire; and often, to save time, this is done whilst taking water for the next stage of the journey. Consequently ash pits generally are constructed alongside water columns; and difficulty has been experienced in finding suitable materials for the purpose. Masonry is apt to crumble under the heat from the cinders; timber is even more vulnerable, and deteriorates moreover when wetted by water spilt from the column. Mild steel and wrought iron are liable to corrosion; and cast iron has not sufficient resistance to impact. A further and more serious danger is that of derailment where ash pits are situated in fast main lines. To obtain information on existing practice, a questionnaire is now being issued to the Indian Government Railways, and officers are invited to give details of their company's experience. With regard to the derailment risk, the covering letter attached to the questionnaire states boldly that "a really satisfactory design for one has not so far been evolved." An interesting practical suggestion for overcoming the difficulty is the use of shallow removable ash trays which can be emptied and replaced in position after use; if a suitable grade of cast iron can be selected, and if the track is relaid with steel sleepers beneath the trays, the chief obstacles may be overcome.

* * * *

Railwaymen Will Not Be Civil Servants

SINCE the Royal Assent was given to the Transport Act, there seems to have been a widespread impression that the transfer on January 1 next to the British Transport Commission of the railways, canals, and other transport undertakings, will result in an enormous accession to the strength of the Civil Service; but in fact, this is not so, as is clearly shown by the wording of the Act. During the many debates which took place while the Bill was before Parliament, the rather vague term "nationalisation" was used to denote the intended change, and the particular form of national ownership received but scant attention. Nevertheless, is is not unimportant now (particularly from the staff viewpoint) to appreciate with more precision the impending change.

What actually has occurred is that a body entitled the British Transport Commission has been established, with wide powers and duties relating to the acquisition, operation, and co-ordination of various forms of inland transport (excluding aviation). This Commission is described as a "Statutory Corporation" and as a "Public Authority." Furthermore, Schedule 1 of the Act specifically states that the Commission shall be a body corporate with pepetual succession and a common seal and power to hold land without licence in mortmain. Schedule 2 provides that every Executive shall be a body corporate with perpetual succession and a common seal. Thus, using ordinary commercial nomenclature, the position approximately is that the British Transport Commission may be regarded as a public company of which all the shares are held by the State, and the various Executives are in the position of wholly-owned subsidaries.

The position of an employee, therefore, will remain that of an employee of a Statutory Corporation (as are the railway companies at present) with neither greater nor less in the way of rights, duties, and obligations, unless such conditions of employment should be varied from time to time (with the customary notice) by the Commission or the appropriate Executive. The railway or other transport servant does not become a Civil Servant and is not amenable to Civil Service conditions.

Broadly, it may be said that an Established Civil Servant is a servant of the Crown, appointed upon the certificate of the Civil Service Commissioners, who allocate successful candidates, selected by open competitive interview and/or written examination, to the various Departments of the State. Unlike the ordinary employee, the Civil Servant has no contract of employment. He is legally dismissible at the pleasure of the Crown, though in fact he enjoys in practice a higher degree of security of tenure than those in any other employment. His salary and other conditions of employment are settled in negotiation with trade unions, euphemistically styled "staff associations," while his non-contributory superannuation rights are defined by Act of Parliament, though, here again, his right to a pension is not absolute in law. Although there is no statutory prohibition against strikes by established Civil Servants, it would appear that there is no recent historical record of a strike in practice, presumably because it would be highly injudicious of a Civil Servant to strike in view of the nature of his employment and, as indicated, the absence of any contract of employment. If a Civil Servant is dismissed because of redundancy he may, but not as of right, receive compensation. If the services of a railway or other transport worker are dispensed with on grounds of redundancy arising from nationalisation, there appears to be the possibility of compensation under the terms of the Transport Act.

On political activities, there is a general understanding that Civil Servants should observe a "certain reserve" in politics, and some departmental regulations preclude them from serving on committees at election times. But there is nothing to prevent them, provided they exercise reasonable discretion, from playing a considerable part in political work. Moreover, they may individually or collectively approach candidates or Members of Parliament on Civil Service issues, although they must not go to Members of Parliament to get support, for example, for their individual claims. In regard to the position of staffs of nationalised undertakings, the Prime Minister in an answer to a Parliamentary Question, on May 1, 1947, made the following statement:—

> "The Government has informed the boards of the general principles which in their view should govern the development of a code of practice in this matter. The broad effect of these is that the vast majority of those employed in our nationalised industries will be as free as those employed in other industries to participate without restriction in political activities, whether national or local. There is, however, one qualification affecting only a small number of employees which does not always apply in other industries. It is desirable that the senior staffs of the boards should establish a tradition of public service irrespective of party allegiances, and it follows that they must exercise a measure of discretion in political matters which will prevent them from engaging in the more controversial forms of political activity."

It should be emphasised that the Public Authority which is a Statutory Corporation is no new feature in this country, but in fact has been described as a typical British compromise. The National Coal Board occupies a comparable position to the British Transport Commission. There is a general similarity in the field of air transport with the British Overseas Airways Corporation, the British European Airways Corporation, and the British South American Airways Corporation. The war years provided such examples as the United Kingdom Commercial Corporation. Even earlier there were generally parallel cases in transport with the London Passenger Transport Board and the Port of London Authority, though with the difference that they issued their own securities (not Government stock) and were directly responsible for meeting the interest payments thereon. Nevertheless, their status as legal corporations, including that of employers, was not dis-similar.

* * * *

The South African Railways

THE settled policy of the Union of South Africa is to co-ordinate transport services of all types under a single administration. The State provides the entire capital and entrusts the management to the South African Railways, which are required to balance revenue against expenditure, including interest on capital. The term "South African Railways" thus covers not only the largest 3-ft. 6-in. gauge system in the world, but road motor transport, ports and harbours, shipping, airways, and various subsidiary activities. This all-embracing organisation has grown up gradually since the 1870s, when the discovery of diamond fields gave a tremendous impetus to the opening up of the inland regions of a country which, together with South-West Africa, now has an area of 790,000 square miles.

The story of the origin, development, and scope of the exist-

ing arrangements is told in a book* published recently by the Railways Public Relations Department. The book is a co-operative effort on the part of all Heads of Departments, but the preface also gives special thanks to Mr. Eric Rosenthal for his help in historical research. In a foreword the Hon. F. C. Sturrock, Minister of Transport, says that this "is the first attempt ever made to provide a comprehensive survey of a State service whose progress in its impressiveness has matched that of a country which has changed from wagon wheel to rails of steel in little more than half a century." He adds that the railways constitute the largest financial enterprise in South Africa and are by far the largest single employer of labour, with over 170,000 men and women on the pay-roll. Mr. Sturrock believes that "this publication will achieve its purpose of placing on permanent record for South Africans and others interested in this fascinating country, the often romantic and always interesting history of the South African Railways."

The opening chapters of the survey are historical, explaining how in South Africa the evolution of State ownership and control was a natural process of which the seeds were planted in the early days of railways. From the first it was recognised that the operation of railways and docks should be in one hand. The separate colonies also saw that, in the absence of inland waterways, railways were needed to open up thinly peopled areas before the lines could be self-supporting. By 1908 these local conditions led to the independent existence of three systems—Cape Government Railways, Natal Government Railways, and Central South African Railways. At that date the Union of South Africa was being formed and the unification of railways was bound to follow within a short term of years. The complete merger came about in 1916, when it was decided that "the railways, ports and harbours of the Union shall be administered and worked under the control and authority of the Governor-General-in-Council, to be exercised through a Minister of State, who shall be advised by the Railways & Harbour Board." It was enacted further that the management should be carried out by the General Manager, governed by such regulations as the Minister may from time to time frame after consultation with the Board. Under this new scheme, Johannesburg, as the main commercial centre of South Africa, became the seat of the unified management.

In 1934 airways operation was transferred from private enterprise to the South African Railways and from that year onwards there was an all-round increase in the volume of transport work. The General Manager became overburdened with routine executive business and in 1945 the general organisation was reviewed. Work was decentralised and the position of the General Manager in relation to the Minister, the Railway Board and his own departmental heads was defined afresh. Seven Chief Managers of departments were appointed with responsibility to the General Manager for their several spheres of activity. These officers, with the Deputy General Manager, act as an executive committee under the General Manager. Their provinces are operating; commercial and industrial questions; harbours, shipping and development; staff; technical matters; airways and finance.

The financial arrangements in force on the South African Railways are worth recording at this time, when the British Transport Commission is being constituted to take charge of inland transport, except air services. In South Africa the railway administration controls its own finances and presents its account to the Union Parliament in an independent budget. The Act of Union laid down two rules for the guidance of the management. First, its work is to be conducted on business principles, with due regard to agricultural and industrial development; secondly, total earnings are not to exceed outlays for working, maintenance, betterment, depreciation, and the payment of interest on capital. At present the capital invested in the whole undertaking is about £228,000,000, of which £195,000,000 bears interest at a rate round about 3 per cent.

In the financial year ended March 31, 1946, new capital expenditure amounted to £7,500,000. That and similar requirements are met through loans floated by the Union Government. Capital is not redeemed. The replacement of assets is provided for by a renewal fund. That is common practice, but a unique feature is the maintenance, out of revenue, of a rates equalisation fund to preserve, as far as may be, uniformity of rates in spite of traffic fluctuations. This fund is dependent on surpluses accruing in times of plenty, and now stands at a figure of £8,000,000.

Detailed estimates of expenditure proposed in each financial year are submitted to Parliament and, if approved, are authorised through an Appropriation Act. The Appropriation Bill for the year ending March, 1948, covers an expenditure of nearly £77,000,000 for revenue services and about £17,000,000 for capital and betterment purposes, making a total of £94,000,000. Parliament does not discuss methods of raising revenue. The administration, through the Minister of Transport and the Railway Board, may adjust rates as necessary to produce the required revenue. The final results of all transport activities are brought together in a net revenue appropriation account and any surplus in this account may be used only for such purpose as Parliament decides. A surplus may be credited to the Rates Equalisation Fund or a loss may be written off against that fund. If there were no balance in the fund, the Minister might take other steps to balance subsequent budgets.

The financial results of the different branches of transport have varied considerably during the years ended March, 1945, 1946, and 1947. On the railways higher costs of working converted a surplus of £1,032,500 in 1945 into deficits of £718,100 and £640,500 in 1946 and 1947 respectively. The resumption of commercial shipping business after the war turned deficits on harbours into a surplus of £984,600 for 1947. The demand for air services is insistent and a loss of £24,600 in 1945 has been wiped out by profits of nearly £16,000 in 1946 and of £290,700 in 1947. Heavy expenditure, however, is being incurred on "The Jan Smuts Airfield," midway between Pretoria and Johannesburg, as well as on other airports and aircraft.

The financial results of the combined undertaking showed a profit of £698,550 in 1945 and a loss of £883,100 in 1946. The figures just quoted do not take into account annual appropriations from net revenue of £500,000 for the betterment fund and £487,000 to reduce the deficiency in pension and superannuation funds. The net result of working in the financial year 1946 was consequently a deficit of £1,870,100.

It was unfortunate that Mr. Marshall Clark, who became General Manager in October, 1945, had to report a deficiency in his first report to the Minister of Transport, but the situation will not perturb the South African people. Many transport services are regarded as performing pioneering duties and are not expected to pay their way. That is notedly the case with road-motor services, which were run at a loss of £410,500 in 1946. The survey tells us that these services have a route mileage of 22,000, employ 1,700 vehicles, and carried last year over 5 million passengers and 1,840,000 tons of goods. It is suggested that the only public transport concern which has more vehicles is the London Passenger Transport Board with its 6,600 buses. The author of the survey has overlooked the extensive interests of the British main-line railways in road transport. The London Midland & Scottish Railway alone has 3,900 road motor vehicles, while Pickfords and Carter Paterson, which are really a public utility owned by the railways, have a fleet of well over 2,000 vehicles engaged in carrying by road consignments varying from small parcels to articles outside the railway gauge.

We have enjoyed the perusal of this book and have learned a great deal from it about the South African Railways. The volume has been produced in good style by the Government Printer, Pretoria, and contains a number of excellent illustrations, maps, and diagrams. We feel sure that the South African Government has acted wisely in bringing all forms of transport under one Minister, one board and one management. After all, the scope of the South African Railways administration is no wider than the field covered by our main-line railways before the Civil Aviation Act transferred air services to the British European Airways Corporation in February, 1947. On comparing the equipment and operations of our four companies with those of the South African Railways, we were impressed by the greater intensity of the work done in this country and by the high degree of co-ordination achieved both within the railway structure and in conjunction with outside enterprises. Let us hope that these links between services of different kinds will not be destroyed by the coming of State-ownership.

* "The South African Railways: History, Scope and Organisation." Published by authority of the General Manager, South African Railways, and prepared by the Public Relations Department, Johannesburg. June, 1947. 7 in. × 9 in. 124 pp. Illus.

Further Light on the "Paget" Locomotive

IN the "Publications Received" column in our issue of June 6, 1947, we reviewed a publication of Hutchinson's entitled "Rotary Valve Engines," by Mr. M. C. Hunter, M.I.Mech.E. Although this book is concerned mainly with internal-combustion engines, which have been the principal field for rotary valve applications, attention is also given to other instances in which rotary or sleeve valves have been adopted; among these the most notable example is the remarkable 2-6-2 locomotive designed by Sir Cecil W. Paget when Works Manager at the Derby Works of the Midland Railway. A most illuminating account of this engine was contributed to our columns by the late Mr. James Clayton, in our issue of November 2, 1945, when a good deal of attention was given to the unusual valve layout.* This account was general, but one of the many valuable features of Mr. Hunter's book is that he views the rotary valves with the eye of a specialist and gives some highly important analyses of their performance. The valves being one of the most original features—and incidentally the "Achilles' heel"—of the design, it is of great interest to read what Mr. Hunter has to say about them, for it is now generally agreed that if only the difficulties arising from these valves could have been overcome, the engine would have been quite successful, and might in that case have been a turning-point in subsequent locomotive history.

Although in Mr. Clayton's view the chief troubles connected with the valves were metallurgical and could have been cured nowadays by more advanced knowledge of high-duty materials, Mr. Hunter finds that power losses due to friction must have been considerable, and undoubtedly caused, rather than resulted from, the partial failure.

Mr. Hunter was fortunate in securing an opportunity to examine the actual records of the preliminary tests, which were taken on a full-size rotary-valve unit under live steam. Table I shows the starting torque (static condition of friction) for various openings of the steam ports, corresponding to various cut-offs. The force needed to drive the valve is greatest when all the ports are open (as one would expect), but this condition obtains only for short periods, as when starting the engine from rest.

TABLE I—STARTING TORQUE OF ROTARY VALVE (TEST TAKEN FEBRUARY 17, 1907). (LINER FLUTED TO BALANCE APPROXIMATELY 40 PER CENT. OF STEAM PRESSURE)

Ports open	Steam pressure, lb. per sq. in.	Weight, in lb., on 24-in. lever	Weight in lb. per lb. steam pressure
1	177	168	
2	177	391	
3	180	480	
3	180	424	
Full open	177	856	
"	174	648	
"	177	801	5380
"	177	826	——— = 4·321
"	180	912	1245
"	180	536	
"	180	801	

Using the values given in Table I, it is possible to deduce that the torque required to start the valves from rest under full steam pressure with all the ports open is of the order of 19,200 lb.-in., and by further evaluation to verify the co-efficient of friction. The co-efficient of friction under these conditions (allowing for the 40 per cent. balancing action of steam on the relieved liner) is about 0·10. Regarded only as a co-efficient of friction, this is not an unduly high figure, comparing favourably with the established value 0·18 for the ordinary "D" slide valve of brass working on a cast iron face (dry).

TABLE II—POWER CONSUMED BY ELECTRIC MOTOR DRIVING VALVE (TEST TAKEN APRIL 4, 1907). (VALVE SPLIT AND BALANCED 40 PER CENT.)

No. of test	Speed r.p.m.	Steam pressure lb. per sq. in.	Ports open	Amperes	Volts	Electrical horse-power
1	214	130	1	15	314	6·32
2	204	155	1	12·5	326	5·47
3	224	155	1	14	322	6·03
4	208	145	2	27·5	311	11·45
5	210	155	2	32·5	313	13·63
6	180	140	3	37·5	290	14·57
7	200	95	Full open	22·5	326	9·84
8	192	100	Full open	32·5	313	13·63

It may be taken that when the locomotive was running at a maximum speed of 80 m.p.h., the valve cut-off would correspond to a setting with one port open. (Extra ports would be needed only for working up gradients or when starting.) Taking the first horizontal row of figures (test No. 1) in Table II, the last figure (6·32) can be corrected to full boiler pressure (180 lb. per sq. in.) and maximum train speed (80 m.p.h. = 420 r.p.m.). Thus:

$$\left.\begin{matrix}\text{Total horse-power for}\\ \text{one valve}\end{matrix}\right\} = 6{\cdot}32 \times \frac{420}{214} \times \frac{180}{130} = 17{\cdot}4 \text{ h.p.}$$

Assuming a cut-off with two ports open (for ascending gradients) and a speed of 60 m.p.h. (*i.e.*, 315 r.p.m. for rotor) and using the results of test 5. *i.e.*, 13·63 horse-power, the corrected figure for full steam pressure is:

$$13{\cdot}63 \times \frac{315}{210} \times \frac{180}{155} = 23{\cdot}7 \text{ h.p. per valve}$$

Probably this represents the heaviest duty required of the valve.

Alternatively, the power loss due to friction may be derived from first principles. The surface area of the rotor can be taken as 430 sq. in.; allowing for 40 per cent. unbalanced, the net area is thus 250 sq. in. The circumference of the rubbing surface is 2·22 sq. ft. The pressure on the valve surface is 180 lb. per sq. in. and the rotor speed 315 r.p.m. Assuming a value of 0·025 for the co-efficient of friction, the work done in turning the valve against friction is:

$$315 \times 2{\cdot}22 \times 180 \times 250 \times 0{\cdot}025 = 800{,}000 \text{ ft.-lb. per min.}$$

Hence power loss $= 800{,}000 \div 33{,}000 = 24{\cdot}2$ h.p.

Comparison of this result with the test figure (23·2 h.p.) shows that the assumed value of 0·025 for the co-efficient of friction is a fair value to take.

It is said that the indicated horse-power of the engine was about 1,000; and since the friction losses for the two valves must have totalled about 50 h.p., the power thus lost must have been about 5 per cent.—an unduly high proportion of the indicated horse-power.

The last two paragraphs of Mr. Hunter's analysis are of exceptional interest as indicating the inherent difficulty of providing satisfactory rotary valves for a locomotive. He writes:—

"... the application of a rotary valve to a steam unit is by no means an easy problem, from the fact that the sealing arrangement is never, and fundamentally cannot be, relieved of pressure between the power strokes as is possible with an internal combustion locomotive.

"The real defect in the design is the excessive area of the sealing device, continuously loaded under running conditions, with the full boiler pressure of 180 lb. per sq. in. and no relief with varying cut-off during periods of expansive working. It is unfortunate that circumstances prevented further work being undertaken on the sealing device, especially as the other unorthodox features in the design proved to be so successful, for which nothing but praise can be given to the designers."

To this assessment may be added Mr. Hunter's early comment that Paget's locomotive appears to be the first case in which a rotary valve was ever applied to a locomotive; and in retrospect one can feel only admiration for the exceptional insight and boldness displayed by Paget, whose great venture came so near to winning him the success he deserved.

* "The 'Paget' Locomotive" has been reprinted in pamphlet form, price 2s., from 33, Tothill Street, Westminster, S.W.1

PRE-MOBILISATION SURVEY OF AMERICAN CIVIL ENGINEERS.—To ascertain how United States civil engineers can be employed most usefully in assisting the nation as a whole in a national emergency, the American Society of Civil Engineers, in co-operation with the War Department, is making a survey of its 22,000 members. Each of them has received or will receive a questionnaire asking him to state his education, civilian experience in military departments or war agencies during the recent war, employment and occupational status, utilisation of engineering experience in civilian wartime employment, military service, and any other facts likely to assist in placing him for potential emergency employment. It will be seen, therefore, that the Americans are looking ahead and, in so far as civil engineering is concerned, are determined that in future national emergencies there shall be a minimum of square pegs in round holes, and that everyone shall be employed as efficiently as possible.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Some Railway Memoirs

60a, Green Lane, Northwood,
Middlesex. August 30

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I have been reading with great interest the instalments of Sir Sam Fay's "Railway Memoirs" appearing in your columns, and I notice that he gave the signal for the funeral train of Queen Victoria to start from Gosport. Can he give the reason why the train left Gosport some eight minutes late?

In a detailed article published in *The Railway Magazine* of March, 1940 (Vol. 86, p. 136) entitled "Queen Victoria's Funeral Journey," compiled by well-known railway historians, it is stated. "For some reason, which possibly never will be settled satisfactorily, the funeral train left Gosport, Clarence Yard, at 8.53 a.m. and was thus eight minutes late on its schedule." Possibly Sir Sam Fay will be able to give the reason.

Yours faithfully,
REGINALD B. FELLOWS

Unification of Railways

18, Wheatsheaf Close,
Woking, Surrey. August 28

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—On the occasion of his recent appointment to the British Transport Commission, Sir Eustace Missenden stated that it would be one of the objects of the commission to weld the railways of the country into a "unified whole." I think it may be possible to do this and yet let the four main-line groups and London Transport maintain their separate identities to some extent. I base my ideas on the following points:—

(1) It has been said on several occasions that the L.M.S.R., as at present existing, is as large an organisation as can be handled conveniently.

(2) Any complete unification in any case would have to be divided up into areas, divisions, and so on, which probably would be known by almost meaningless numbers or signs.

(3) It would assist in passengers (and parcels, etc.) finding their way about. Even now, 25 years after the grouping, it is still very usual to speak of travelling by the G.N. route, the Midland route, this might as well be done officially as unofficially.

(4) It would keep some sort of spirit of competition alive; competition between an "Area B" and an "Area C," for sake of argument, is never likely to be so keen as between a "G.W." and a "S.R." area.

(5) Within the framework of this unified whole, engineering and similar departments could be standardised to any extent desired rather after the manner adopted by the Indian railways, for example.

Yours faithfully,
J. B. LATHAM

The Structure of Indian Railway Organisation

189, Goldstone Avenue,
Hove, 4, Sussex. August 23

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I have read with interest the extremely informative editorial under the above heading in *The Railway Gazette* of August 22. Your tribute to the great part played by the Indian Railways in two world wars is very welcome, and the descriptions of their higher and executive administrations and of their general organisation and working are extremely instructive. Moreover, the objects and achievements of the Indian Railway Conference Association, as admirably outlined in four of your paragraphs, are an object-lesson to other countries. In fact, it is to be hoped that the British Transport Commission will see and study this editorial.

At the same time, there are in it one or two points that appear to require clarification. For instance, you say: "Two big lines came under direct State control during the first world war, and in 1923 the East Indian and Great Indian Peninsula companies passed from company to State control." You mean, of course, "systems" or "railways" *vice* "companies," but it would be interesting to learn which "two big lines" are referred to in the first part of this sentence. My memory is not what it was, but, to the best of my recollection, the E.I. and G.I.P. Railways did not come under Government control until 1925. Is the subsequent figure "16,354" correct?

In the second column, the N.W.R. mileage is given as over 6,700; the latest figure I have seen quoted is 6,886. Also, in the same paragraph, it would appear that both the Jodhpur and Bikaner Railways are omitted as Class 1 lines in Indian sovereign States, an omission repeated in the last paragraph but two of your editorial. These two administrations together operate over 2,000 route-miles of line.

Then, in the 13th line of the second column on page 201: "The officers from the Railway Board . . ." Should this not read "of" or "forming" *vice* "from"; or, better still, "The members and staff of the Railway Board"; or is this not what is meant? (All these may seem minor points, but in the interests of clarity and accuracy would appear to need explanation.)

The principles, here explained, which are followed in the selection of officers for appointment to and under the higher administrative authority might well be applied in this and other countries. Moreover, the sentiments expressed in the following "*esprit de corps*" paragraph cannot be over-stressed in connection with the nationalisation of railways.

Yours faithfully,
F. S. BOND

[(1) The Bengal North Western and Eastern Bengal Railways.

(2) The East Indian and G.I.P. Railways came under Government control in 1925.

(3) We believe that 16,354 is correct.

(4) The North Western Railway mileage was given as over 6,700 miles which is an approximate figure as small sections have been added or lifted.

(5) "The officers *from* the Railway Board . . ." should have read "*of*."—ED. *R.G.*]

L.N.E.R. Third Class Sleeping Cars

76, Elgin Crescent,
London, W.11. August 28

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—The new L.N.E.R. third class sleeping car is an excellent example for demonstrating the time gap which always exists between the conception of an idea and its practical execution. The essential arrangement of the intersecting independent single compartments was published in British Patent No. 20091/1892. It has taken over half a century till the car appears on the rails.

Yours faithfully,
W. JACOBSOHN, ASSOC.I.MECH.E.

Lessons from Continental Railway Practice

London, N.21. July 29

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Every time I have travelled to and from the Continent, I have been struck by the great degree of co-ordination and similarity in services and facilities provided in many European countries, and the differences between them and those provided in the United Kingdom. One does not like to propose "change for change's sake," but at a time when Britain is preparing to popularise tourist travel from abroad, it would, I feel sure, be opportune to see some of our arrangements brought more into line with those obtaining in Europe. As it is, though, arrangements virtually cease at London except in a few cases.

Thus, for example, timetable signs and arrangements are fairly consistent in all European countries, but are not so in England. Again, baggage registration is (or was) normally available between any two stations in Europe, but is unknown here except to and from certain Continental stations. This surely would be a greatly appreciated facility. There would also seem to be a case for following the Continental lead, which seems to me fairer, of designating local trains (where no very luxurious travel is provided) second and third class, whereas it would be reasonable to ask passengers travelling on such luxurious trains as the pre-war streamliners and Pullman trains to pay at least second class fares, and to designate these *trains de luxe*, first and second class. Ordinary trains might continue to be first and third, or become first, second, and third as thought advisable.

I have been looking at the matter from a passenger's point of view only, and because your space is valuable, will not labour many other points which also could be mentioned, such as multilingual notices in trains—almost universal in main-line stock abroad.

Such things are not changed in a day, but perhaps some approach might be made to the problem now that Continental connections are getting into their stride again, and I am sure it would help the "foreigner" visiting this country; and, not less important, the Englishman abroad would feel less "at sea."

Yours faithfully,
TRAVELLER

The Scrap Heap

SEATS ON TOP

Conundrum going the rounds of Whitehall:

What is the difference between London Transport and the Coal Board?

Answer: The Coal Board has more passengers.—*From the "Evening Standard."*

* * *

"Since they came into office two years ago, Ministers have contributed only one new idea to economic policy and that one, the nationalisation of basic industries, is of precisely no relevance at all to the present crisis."—*From "The Economist."*

* * *

UNDERSTATEMENT

A stationmaster reported a murder in a train in the following terms: "The murderer entered the compartment from the platform, stabbed the victim savagely five or six times, and emerged on to the line from the opposite door—thus infringing the company's regulations."—*Herbert Dingle in "Through Science to Philosophy."*

* * *

LIGHT WORK

Mr. E. V. M. Powell, Chief Operating Superintendent, Burma Railways, has sent us the following extract from a Pitman's shorthand textbook, with the comment that if the reminiscences were true it might account for the desire of some people to nationalise the railways:—

"The Traffic Manager spoke as follows: 'Gentlemen, I thank you very much indeed for your extremely generous present, and for the very kind words uttered by our esteemed General Manager on your behalf. As it has been hinted to me that remarks of a reminiscent nature would be welcome just now, I may tell you that in my early days, soon after I joined the Lancashire & Yorkshire Railway Company, I had to proceed to a wayside station with a breakdown plant, in connection with an unfortunate accident.

'For my slight services I was recommended for the post of Chief Mechanical Engineer and, after several years' experience of such, I became District Traffic Manager, the duties of which have been comparatively light, thanks to the unswerving loyalty and devotion of every employee of the company. Once more I thank you warmly for your gift.'"

* * *

FISHY BUSINESS

Trout 23 in. long, weighing 4½ lb., was found in an engine supply tank at Hurlford, Ayrshire. The trout is believed to have been sucked into the tank through the filler pipe from a nearby catchment area when it was small, and to have dodged being drawn into one of the hundreds of locomotives which have since filled up at the tank.—*From the "Daily Mirror."*

THE TRAIN THAT GOT NOWHERE

The train which left Birmingham, New Street, for Euston at 2.35 p.m. yesterday arrived back 35 minutes later. It had done a circular tour of Birmingham's suburbs. Explanation last night: The routing indicator broke down and the train got switched in error to the Manchester line. It had to be switched off that line and into the station again before it could run to Euston. It left again at 3.15.—*From the "Daily Express" of August* 26.

* * *

100 YEARS AGO

From THE RAILWAY TIMES, *Sept.* 5, 1847

CALEDONIAN RAILWAY.—At the Half-yearly General Meeeting of the Caledonian Railway Company, held in the Royal Hotel, Edinburgh, on Tuesday, August 31, 1847,

J. J. HOPE JOHNSTONE, of Annandale, Esq., Chairman of the Company, in the chair,

The Secretary having read the advertisement calling the meeting, the following resolutions were passed unanimously:—

1. That the common seal of the Company be affixed to the register of shareholders (which was accordingly done in the presence of the meeting.

2. That the report of the Directors now read be received, adopted, and circulated among the shareholders.

3. That John James Hope Johnstone, Esq., William Lockhart, Esq., M.P., Robert Johnstone Douglas, Esq., James Seton Wightman, Esq., and the Right Hon. Fox Maule, M.P., be re-elected Directors of this Company.

4. That Henry Pocock, Esq., be re-elected one of the auditors.

It was moved by Sir Andrew Agnew, Bart., and seconded by John Meiklem, Esq.—

"That there be a total cessation of traffic on this railway on the Lord's-day;" and on the question being put the motion was negatived.

J. J. H. JOHNSTONE, Chairman.

The Chairman having left the chair,—It was further moved by Sir Andrew Agnew, Bart., and carried by acclamation, that the thanks of the meeting be given to the Chairman for his conduct in the chair.

J. W. CODDINGTON, Secretary.

SOME RAILWAY MEMOIRS—4

By Sir Sam Fay

The pay of railway clerks was poor. We formed a committee, of which I was secretary, to present a petition to the Directors through the General Manager. We obtained an interview, having to wait at Waterloo for some time. In the interim one of our number managed to get "half seas over." We all got increases of pay, except the clerk who looked upon the wine when it was red. . . .

In 1880, in conjunction with Messrs. Goff and Dyer, clerks in the General Manager's office at Waterloo, I started the *South Western Gazette*, the profits going to the L. & S.W.R. Orphanage Fund. I also wrote a short history of the South Western Railway. Without the help of my friend William Drewett, a former editor of the *Surrey Comet*, I could not have had it printed and distributed.

This little book was responsible for my railway career. . . .

Sir William Harcourt, Chancellor of the Exchequer, walking sedately along Waterloo platform to his reserved seat, was assaulted by a porter's barrow, which hit him in the bend of the knee. Sir William, a heavy man, had some difficulty in resuming the perpendicular. He ascertained the porter's name and demanded his immediate dismissal. On another occasion he journeyed from Brockenhurst seated on his own portmanteau. A sarcastic letter reached the Chairman of the railway company from one who regretted that circumstances forced him to travel upon such a railway. . . .

* * *

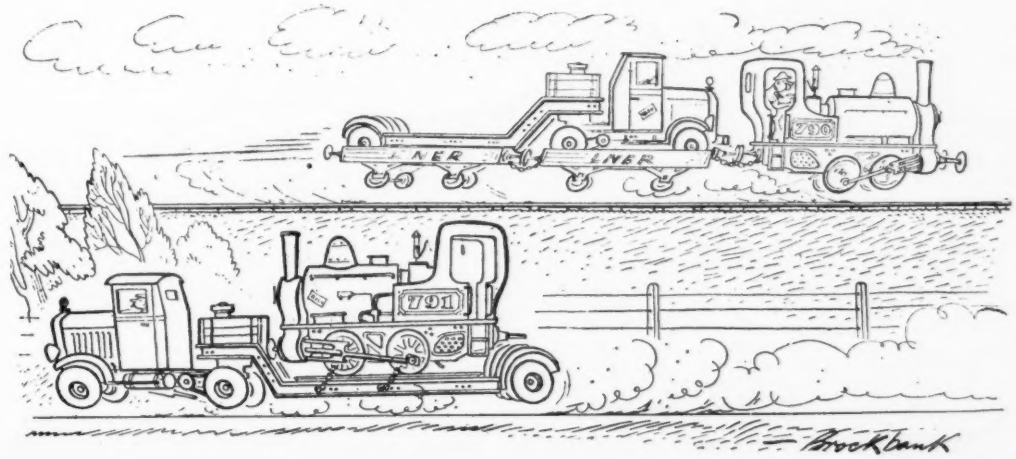
TAILPIECE

To a Stationmaster

Oh, furrow not that noble brow,
Good Master! Why the visage haggard?
Our ways are nationalised now,
Our hours of locomotion staggered.
And overcrowding, running late,
And Acts of God and blows of fate,
Like ice and snow, and floods in spate,
Will all be crimes against the State.
Frowns will give place to smiles benign,
And comfort reign along the line,
For all these things, you know, must be
In State-controlled tranquillity!

A. B.

Rail and Road Co-Ordination



[*Reproduced by permission of the proprietors of "Punch"*

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

QUEENSLAND

Townsville Port Development

Important harbour development works are to be undertaken at Townsville, in Northern Queensland, served by the North Coast railway. They include two new piers, with a dredged depth of 34 ft. alongside them; modern cargo sheds, cranes and other equipment; and a new tug. The total estimated cost is in the neighbourhood of £1,000,000.

NEW SOUTH WALES

New Sydney Suburban Lines Sanctioned

An important Railway Bill was passed recently by the State Government. It covers a network of lines to serve the eastern suburbs of Sydney, consisting of seven new sections with an aggregate length of 83 miles, of which no fewer than 32 will be underground. The estimated total cost is £42 million and the various extensions are tabulated below:—

New section of line	Length (miles)	Length underground (miles)	Estimated cost £
Central station to Bondi Beach	14·9	11·9	9,449,000
Bondi Beach—Double Bay loop line	8·1	2·1	3,170,000
St. James Station (City) to Kingsford	12·0	6·0	6,449,000
Kingsford—Showground loop (via Maroubra)	23·1	6·0	10,305,000
Darlinghurst — Clovelly —Coogee	8·8	5·8	6,338,000
Sydenham — Beaconsfield —Redfern	7·3	—	2,579,000
Marcot—Matraville ...	8·8	—	3,710,000
	83·0	31·8	42,000,000

The Central Station-Bondi line will be taken in hand first, but it is not expected that it will be completed in under seven years.

SOUTH AFRICA

Luxury Bus Tours

The railways hope to make their road motor services comparable with any in the world, and the arrival of 14 new luxury buses will enable a beginning to be made with the programme of improving existing services and opening new ones in different parts of the Union. A luxury tourist service from Johannesburg to Durban (see *The Railway Gazette* of June 13) will be the forerunner of other similar services that will help to popularise touring by road.

Passengers from Johannesburg will be able to spend two days at Durban, and passengers from Durban will stop at Johannesburg for three days. The tickets for these tours will be interchangeable with rail tickets for any portion of the journey, and, if desired, passengers will be able to break their journey at any point of the trip and continue either by train or by the next following bus.

The new buses have seating accommodation for 37 passengers, but will, by special arrangement, be able to carry 40. The seats are arranged in pairs on either side of a central gangway, with a wide settee at the back extending the full width of the coach. All seats are individually adjustable to a reclining angle. Under each seat is space for light baggage, and heavier baggage can be stored under the floor and in a special luggage compartment at the back of the coach. Forced draught ventilation through special filters is provided, and individual reading lights have been fitted for night travel.

Some of the new buses will operate on the competitive service between Johannesburg and Vereeniging. In addition, the railways propose to run a number of Sunday trips from Johannesburg to beauty spots in the Transvaal. Picnic lunches will be provided by the railways catering department.

FRENCH SOMALILAND

Railcars for Djibouti Railway

An order for twelve diesel-electric railcars for the Djibouti-Addis Abeba line was placed recently in Switzerland by the Compagnie du Chemin de fer Franco-Ethiopien de Djibouti à Addis Abéba. The line is narrow-gauge, and 486 miles long, and one of the main difficulties connected with the design of the type of railcar ordered is ensuring that the engines will be adaptable to changing altitudes and air conditions, as the difference in altitude between the port of Djibouti and the Abyssinian capital is 8,200 ft. The mechanical parts of the railcars are to be built by the Swiss Locomotive & Machine Works, of Winterthur, while the electrical equipment is to be supplied by Brown, Boveri & Company, of Baden.

PALESTINE

Further Cases of Sabotage

Sabotage against the Palestine Railways during the past two months has been spasmodic, and, in many cases, has coincided with the arrival of illegal immigrant ships in Palestine territorial waters. An example of this occurred on July 20, when three goods trains were blown up, but fortunately were not damaged seriously, and four other mines were discovered on various parts of the system. These events coincided with the arrival of the illegal immigrant ship, *Exodus* 1947, from which 4,500 refugees were transhipped and returned to France.

Patrolling of the line continues, but it is inevitable that certain mines, especially of the contact type buried in ballast, are overlooked occasionally.

Ports Services

The result of the year's working of the ports of Haifa and Jaffa presents a more cheerful aspect than that of the railways, and reflects a surplus on working of £P.477,195. A net revenue surplus of £P.434,256 was recorded. Palestine ports are controlled by the General Manager, Railways, who is the Ports Authority. Staple exports are oil, citrus (seasonal), and potash, but general import cargo, which now is arriving in greater quantities as a result of the lifting of controls and improved world supplies, accounts for the major part of the earnings.

ITALY

Trans-Appennine Reconstruction

Repairs to the heavily-damaged trans-Appennine line between Rome and Pescara, on the Adriatic (see *The Railway Gazette* of May 9), are proving difficult because of the mountainous country. Recently, however, the work of rehabilitation was completed on the 8·7-mile section between Manopello (15 miles west of Pescara) and Torre dei Passeri, which was reopened to traffic. The only section still closed to traffic is between Torre dei Passeri and Bussi (7·6 miles), but it is expected that repairs will be completed in a few weeks. The whole line, which is standard-gauge and single-track throughout, is 149 miles long.

Fares and Rates Increased

A few days after a rise in fares on the Italian State Railways had been announced, the goods rates underwent an all-round increase of 50 per cent. The only exceptions are the rates for wheat and its derivatives, hard coal, pyrites, and iron scrap. The increases in both fares and rates became effective on August 1. The higher fares were foreshadowed in *The Railway Gazette* for May 16 in connection with the rising wages costs.

Mileage and Equipment Statistics

According to the latest official particulars, the Italian State Railways system at May 31 totalled 9,873·9 route-miles, of which 1,863 route-miles was double-track. Electrified lines totalled 2,794½ route-miles. On the same date motive power consisted of 2,164 steam locomotives, 935 electric locomotives, 191 internal-combustion railcars, 19 diesel-electric railcars, 98 electric railcars, and six *elettrotreni* (railcar train-sets). The rolling stock in service was made up of 87,540 goods wagons, 1,763 coaches, 2,090 goods wagons adapted for the conveyance of passengers (not included in the 87,540 already mentioned), and 1,656 luggage vans.

CZECHOSLOVAKIA

Prague-Berlin Express

For the first time since the war, the operation of a through express train between Prague and Berlin, *via* Dresden, was resumed on July 14. This express runs daily each way, and conveys through coaches between Belgrade and Berlin *via* Bratislava. In addition, during the summer season a through coach between Karlovy Vary (formerly known as Karlsbad) and Berlin is operated thrice weekly.

FRANCE

Paris Passenger Transport Board

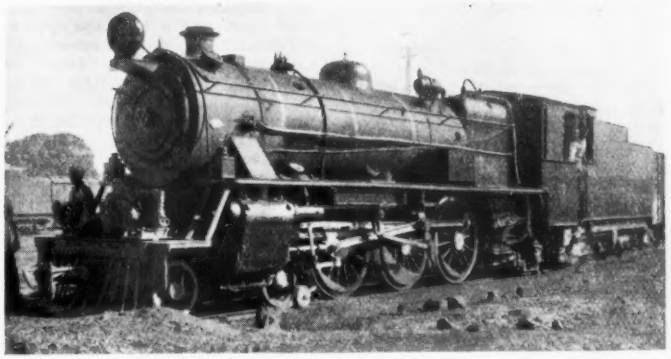
Plans for the reorganisation of transport in the Paris area are making progress. A Bill drafted by the Communications Commission of the National Assembly embodies the main points of the various plans hitherto proposed. It provides for the formation of two organisations. One is a Paris Regional Transport Office, which would undertake the technical planning of all passenger transport under the authority of representatives of the different municipalities in the area.

The other organisation is the Paris Passenger Transport Board proper, which would take over primarily the Paris Metropolitan lines and bus services, but might also incorporate any other transport services throughout its extensive area. The board would operate in a district with a radius of 30 to 40 miles around Paris, comprising the Seine (Paris), Seine-et-Oise, and Seine-et-Marne departments, and part of the Oise department. Financial participation of the State and the municipalities would be limited to less than 15 per cent. of the receipts in any one year.

The regional office would consist of a technical committee for planning operations, and a responsible general assembly. No route could be operated unless it had been accepted for inclusion in the transport plan, which might be modified every two years. It is pointed out that more than 50 per cent. of the transport services in the area at present have no direct connection with Paris.

The Mysore State Railway

An independent system having working arrangements with other lines for long-distance through traffic



Mysore State Railway "YB" class Pacific, built by Robert Stephenson & Co. Ltd.

Photo] [*J. B. Chadwick*

THOUGH consisting of only 748 route-miles of line, the Mysore State Railway is an Indian Class 1 system, owned and worked by the sovereign State of that name. It has 609 miles of metre gauge, 102 miles of 2 ft. 6 in. gauge, and 27 miles of 2-ft. gauge line. The administrative headquarters are at Mysore City, the State capital, but the principal traffic centre is Bangalore.

In addition to the Madras & Southern Mahratta broad-gauge main line from Madras, three important Mysore Railway lines of metre gauge radiate from Bangalore, as will be seen from the accompanying map. They run to Harihar, to Hindupur, and to Mysore.

The Bangalore-Harihar line is the first section of the through metre-gauge mail route to Hubli, Londa, and Poona, Harihar being 210 miles, and Poona 626 miles from Bangalore. Until December 31, 1937, this route was worked throughout by the M.S.M.R., despite the fact that the first 210 miles were owned by the Mysore Railway. Since January 1, 1938, however, all trains between Bangalore and Harihar, situated on the State boundary, have been hauled by Mysore Railway locomotives, and the through mail and express workings to and from Poona have been shared by the two railways, as the remaining 416 miles from Harihar onwards to Poona are owned by the M.S.M.R. The rakes are provided by the M.S.M.R. and Mysore Railway in the proportion of three to one.

From Birur Junction, between Bangalore and Harihar, a metre-gauge branch line runs through Tarikere, Bhadravati, and Shimoga, and at present terminates at Sagara. At Bhadravati it serves the iron works of that name, the pioneer plant in southern India.

The Bangalore-Hindupur section, 63 miles, running to the northern State boundary, is also a part of another through route, from Bangalore to Guntakal, 176 miles, owned by the Mysore and M.S.M. Railways. Prior to 1938 the latter worked the whole line, but subsequently the Mysore Railway has been working its own section to Hindupur, similarly to the one to Harihar. Through mail and passenger rakes are provided in the proportion of two to one by the M.S.M.R. and Mysore Railway respectively. Guntakal is on the broad-gauge main line from Bombay to Madras, but there is, in addition, a metre-gauge line thence to Hubli, and the mails work through from Bangalore to Hubli by this route also.

Proposed New Through Route

The Bangalore-Mysore line is in a somewhat different category, as it has a ruling grade of 1 in 70 and 10-deg. (573 ft. radius) curves. An extension of this line at present terminates at Chamarajanagar, south of Mysore, but there is a live project for its continuance through difficult country down from the Mysore plateau to meet the South Indian broad-gauge system at Mettupalaiyam. As will be seen from the map, this line, when completed, will provide a short cut from the north to south-western India, saving the long detour *via* Bangalore and Jalarpet. From Mettupalaiyam, also, the metre-gauge mountain railway, worked partly by rack, ascends to Coonoor and Ootacamund, 7,000 ft. up in the Nilgiri mountains; its ruling gradient is 1 in 12½.

The remaining lines of the Mysore system are mainly of metre gauge, but the Kolar loop is of 2 ft. 6 in. gauge, and the Narasimharajapura branch from Tarikere has a 2-ft. gauge. The Mysore-Arsikere chord line is a useful link *via* Hassan, and will become important when the through route *via* Chamarajanagar is opened.

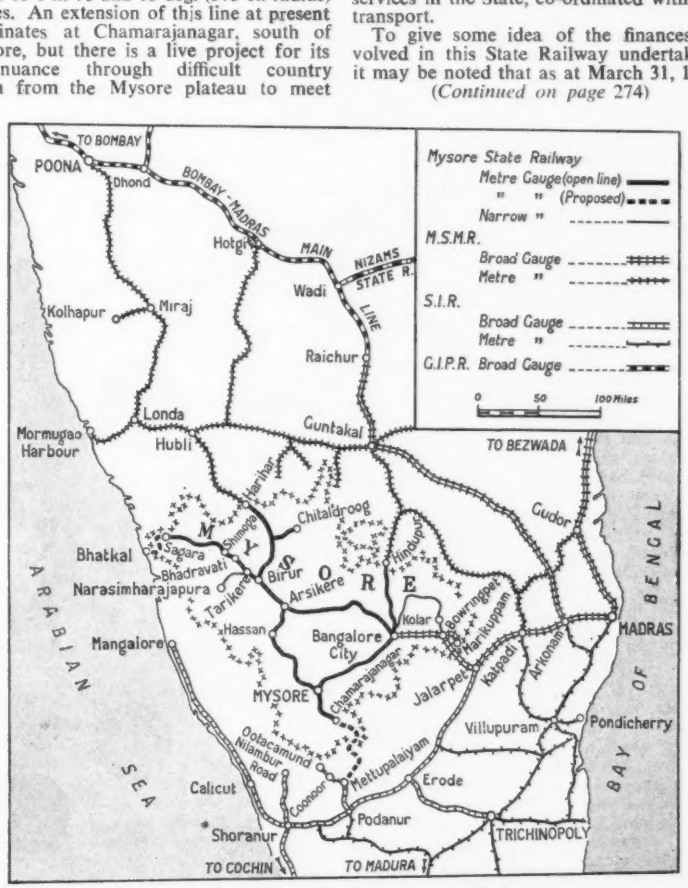
Traffic and Finance

The principal items of goods traffic are rice, wheat, maize, oil seeds, coffee, timber, perishables, and iron and other ores. Of the more valuable commodities carried, the most notable are gold from the famous Kolar goldfield, in the east of Mysore State, and sandalwood oil, manufactured in Mysore City and the basis for so many perfumes. Mysore coffee is famous the world over. Though much of the military traffic to and from Bangalore is carried by the broad-gauge line, an appreciable amount passes over Mysore metals, especially foodstuffs, and in particular vegetables and fruit supplies.

The Mysore State Railway runs no bus or lorry services at present, but a proposal is under consideration for the formation of a joint stock company to run road services in the State, co-ordinated with rail transport.

To give some idea of the finances involved in this State Railway undertaking, it may be noted that as at March 31, 1945,

(*Continued on page* 274)



The Mysore State Railway and connecting lines

Nationalisation of Railways: Railway Workers' Control

A proposal for operating the railways through a system of committees elected by the staff

A PAMPHLET has been issued recently by Mr. James Jary from 205, Euston Road, London, N.W.1, suggesting methods by which the workers' control of the nationalised railways may be effected.* He draws attention to the general recognition of the fact that nationalisation in itself will not produce the efficiency and enterprise demanded of it, and suggests that it is necessary to provide for the democratisation of the industry so that the problem of securing men of wide knowledge and experience will no longer exist for future Ministers of Transport.

Current tendencies, Mr. Jary suggests, indicate that decentralisation on a regional basis is likely to be the pattern of development pursued by the railways, and he claims that in this way full co-ordination between road and rail would be easy. He therefore bases a case for the establishment of a system of Worker-Management Councils on the assumption that some form of regionalisation will be adopted as an administrative element between the staff at the station or depot and the Railway Executive Committee. He suggests that, instead of the existing local departmental committees, a local committee should be established at every station, embracing representatives of every grade, but admits that, at very large stations, this would provide too many representatives so that all grades could not be represented.

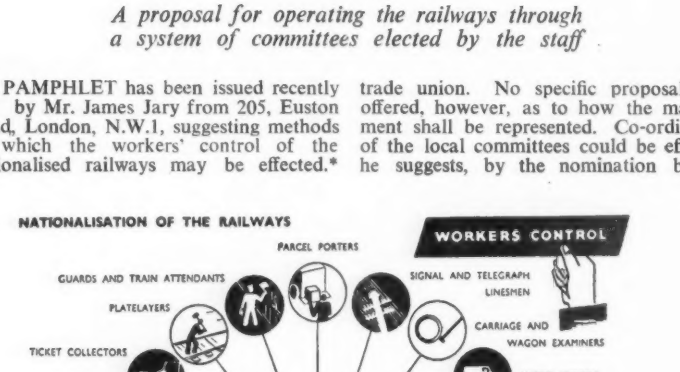
The election of such members presupposes, however, that the railway trade union movement will be reorganised on the basis of one union, and that they would be nominated by the local branch of the trade union. No specific proposals are offered, however, as to how the management shall be represented. Co-ordination of the local committees could be effected, he suggests, by the nomination by the workers of one representative, not necessarily a member of the local committee, to serve on a sub-regional committee composed of representatives of all sections of the staff in the area.

Proceeding further along this line, Mr. Jary suggests that to secure proper co-ordination of the workers' interests, there should then be a Metropolitan Regional Committee appointed from members nominated by the workers in the sub-regional committee areas. This would lead in turn to the election of regional committees for each of the present regional traffic areas, and finally to the election of a Central Railway Committee on the basis of one representative from each region, again elected by the ballot vote of the workers.

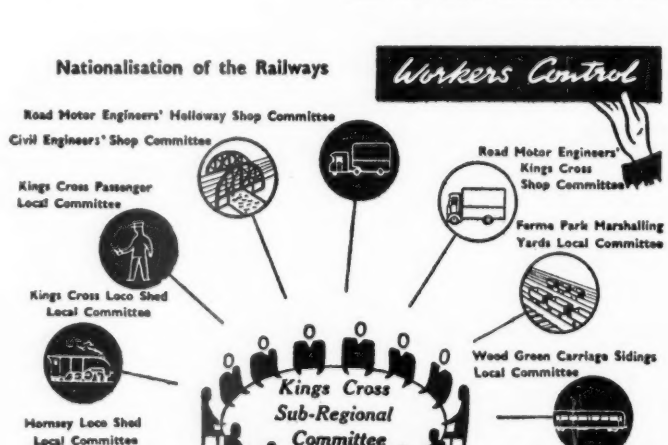
Having outlined briefly proposals for workers' control committees, the author then discusses their functions in the light of that Section of the Act which requires the Transport Commission to make proper arrangements, with appropriate organisations, for the provision of machinery to settle conditions of employment, and so on, and for the discussion of matters affecting the safety, health, and welfare of persons employed by the Commission; and other matters of mutual interest, including efficiency in the operation of the services. This, he suggests, provides a wide range of subjects on which the workers can express their views.

Recruitment and Training

Turning to the questions of recruitment and training, it is suggested that entry to the railway service should be based on elementary psychological tests, coupled with advice and information from local education authorities. The local committees should be the bodies to approve candidates for the service, and be responsible for their training until they are qualified. It is proposed that after a probation-



"*An all-embracing local committee*"


Nationalisation of the Railways
Workers Control
Road Motor Engineers' Holloway Shop Committee
Civil Engineers' Shop Committee
Road Motor Engineers' Kings Cross Shop Committee
Kings Cross Passenger Local Committee
Ferme Park Marshalling Yards Local Committee
Kings Cross Loco Shed Local Committee
Wood Green Carriage Sidings Local Committee
Kings Cross Sub-Regional Committee
Hornsey Loco Shed Local Committee
Holloway Carriage Sidings Local Committee
Kings Cross Goods Depot Local Committee
Farringdon Street Goods Depot Local Committee
Receiving Offices and Satellite Depots Local Committee
Finsbury Park Local Committee

"*Co-ordinating the committees*"

* "Nationalisation of the Railways. Workers' Control." By James Jary. Obtainable from James Jary, c/o 205, Euston Road, London N.W.1. Price 7d.

ary period, each candidate should discuss with the local committee the lines of his future study, and to assist this, an elementary training college should be established in each region where all the implications of economics, history, geography, trade union history, railway organisation and administration could be discussed. This gives rise to the question, which is not satisfactorily answered, as to who will fill the lower-grade posts for which such educational qualifications are not necessary. Finally it is suggested that the system of training should be crowned by a national administrative college, to which candidates would be sent by the regional training centres on the basis of an open competitive examination.

Methods of Promotion

Turning to the subject of promotion, Mr. Jary suggests that while no fault can be found with the psychological and aptitude tests now employed, provided the material used is appropriate, these in future should be supplemented by other tests, and promotion should be settled by the local and regional committees. It is proposed seriously that vacancies should be advertised to every worker at the place concerned, irrespective of grade, and that the local committees should consider all applications and interview selected candidates.

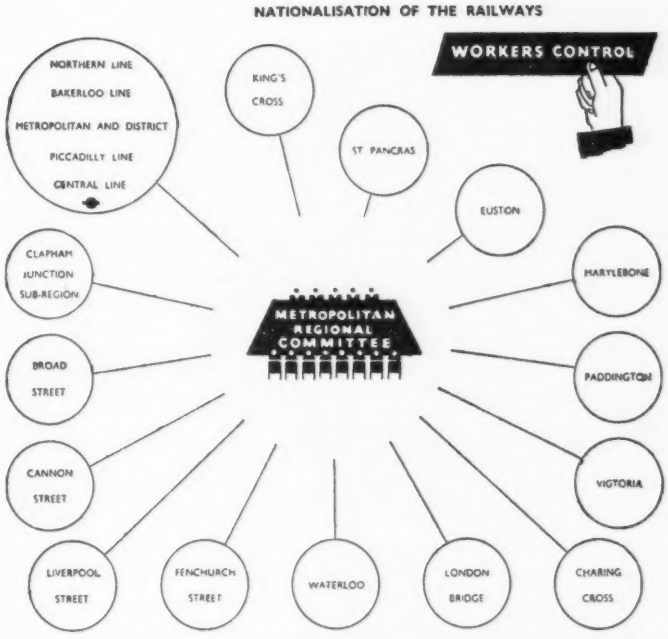
Applicants would be required not only to satisfy the committee that they had the requisite technical knowledge for the job, but would have to produce their record of trade union activity. It is stated naively that it would not be sufficient for applicants to show a paid-up card in the union, but evidence of interest in the functions and purpose of the union, and some record of work on its behalf would be an essential factor!

Finally, it is suggested that all the highest posts should be advertised when they become vacant. As a result, it is suggested that workers' control would not embarrass the railway officer in the use of his technical skill, but rather would enable him to develop his powers in a much wider field; and he would be happier in the knowledge that by his friendliness and frankness, he stood as part of a team with the other ranks in performing a useful service to society.

U.S. Aid for Greek Railways

According to recent official U.S. information, contracts totalling $72,400,000 were awarded to six American companies early in August for the construction and rehabilitation of Greek railways, roads, bridges, and ports under the $300-million U.S. Aid to Greece Programme. A total of $64,000,000 will go for work on railways, roads and bridges, $17,500,000 for the reconstruction of three Greek ports and the Canal of Corinth; and $900,000 for the fabrication of steel for 14 bridges.

For railway repairs, $8,500,000 in dollars and $6,500,000 in drachmae for local expenditure will be used in the rebuilding of bridges, repair of track, and purchase of rolling stock and equipment. The Greek railway system, totalling about 1,600 route-miles, was crippled during the war by demolition of bridges and tunnels, destruction of rolling stock and locomotives, and damage to track. Temporary repairs through substantial aid from the British Government and from U.N.R.R.A. enabled some lines to be restored after the liberation of the country.



Proposed regional committee representing London termini

Regional committees and National Railway Council

SCINDE, PUNJAUB, & DELHI RAILWAY COMPANY.—It has been notified that, on June 30, 1947, a total sum of £4,313,427 1s. 5d. was invested for the purpose of providing a sinking fund in respect of the annuities Class " B."

L.M.S.R. CONTRACTS FOR CONSTRUCTIONAL WORK.—The L.M.S.R. announces that contracts have been placed as follow:—

With Wm. Nicholson & Sons (Leeds) Limited, for the construction of tank foundations, paving, and drainage at Farnley motive power depot (Yorks.) in connection with fuelling facilities for oil-burning locomotives.

With Hammond & Miles Limited, Ilford, for the replacement of yardmaster's office and other work at Poplar (London) " A " Depot.

With G. F. Tomlinson & Sons Limited, Derby, for the construction of foundations for a new 57-ft. dia. turntable on the site of the existing 42-ft. dia. turntable at Burton No. 1 engine shed.

With Edward Wood & Sons Limited, Derby, for the construction of a concrete floor to the wagon shops at Bromsgrove (Worcs.) in replacement of the existing timber floor.

With E. C. & J. Keay Limited, Henley-in-Arden, Warwickshire, for steelwork in connection with the renewal of engine shed roofs at Toton (Notts.), Hasland (Derby), Saltley (Warwick), Cricklewood (Middlesex), and Kentish Town (London) motive power depots.

Testing Locomotives on the Line

L.M.S.R. mobile testing plant includes three braking units, which are, in effect, electric locomotives designed for braking instead of pulling, and capable of absorbing 1,500 h.p.

L.M.S.R. test train carrying a cup anemometer and vane whereby the speed and direction of the resultant wind are electrically recorded on the dynamometer chart

A NEW test train, known as the mobile testing plant, was authorised on the L.M.S.R. in 1936, comprising a special tender, a dynamometer car, and three braking units. It had previously been the practice on the L.M.S.R. to test locomotives by means of a dynamometer car marshalled between a locomotive and train, and which recorded speed, tractive effort, and units of work done on a moving chart. These tests were carried out under ordinary running conditions on the line, and had proved suitable for requirements of that time.

It became necessary, though, to develop a more accurate means of locomotive testing on the line, and for this, constant working conditions of a locomotive had to be maintained on undulating track. It was found on investigation that this could be done by the use of electric locomotives with rheostatic braking, having a very sensitive form of control that would maintain an exactly constant speed, irrespective of changes in the drawbar pull of the engine or the resistance of the track.

The Mobile Testing Plant

In the L.M.S.R. mobile testing plant, each of the braking units is, in effect, an electric locomotive designed for braking instead of pulling, and is capable of absorbing up to 1,500 h.p. These three units are very similar in design, except that they have different gear ratios for testing different classes of locomotive, and have maximum speeds of 50, 90, and 120 m.p.h. respectively; they may be used singly or in any combination, and together will give a maximum braking effort of 23 tons. The master controls for all three braking units are mounted in the dynamometer car, which thus serves both as an independent vehicle for controlling the braking units and to measure the speed and drawbar pull.

The three braking units, which were practically completed in 1939, have been used during the war as emergency power generators, and now are being reconditioned. The tender and the dynamometer car are as yet uncompleted, but tests meanwhile are to be made using the low-speed unit and the L.M.S.R. No. 1 dynamometer car, which is being equipped with necessary apparatus.

The special tender, which can be attached to any locomotive of standard type, is intended for measuring the rates of consumption of coal and water during the test. Three tons of coal, previously weighed out into hundredweight bags, can be carried in a special compartment and brought forward as required. A further three tons of loose coal, for use at other times than the periods of test, also can be carried in a bunker of normal shape. The tank contains 3,500 gallons of water, and the feed from the tender to the locomotive is measured by a displacement-type water meter. A corridor connects the front of the tender with the dynamometer car.

The new dynamometer car will have the form of a double bogie coach, with a single additional unflanged road wheel mounted on the leading bogie for accurately measuring the speed of the train and the distance travelled. It will contain an Amsler hydraulic dynamometer coupled to the leading drawhook through a friction draw-gear.

The dynamometer is connected with a recording table which will give a continuous record of drawbar pull, speed, work done, etc., on a basis of either time or distance. The master controls of the three braking units are fitted in a desk panel, and instruments are provided to indicate the loading of each of the units. Another panel will carry instruments for studying working when running.

The braking units are similar in construction to very powerful motor coaches, and the "motors" are really generators resisting the motion of the train. The power generated is absorbed by banks of resistance grids which are cooled by being located in vertical "chimneys," up which a current of air is forced by motor-driven fans.

The energy of braking is finally dissipated in two columns of hot air expelled vertically through openings in the roof; the openings are protected by sliding covers when not in use. As the full power of the generators may be required at very slow speeds, they are separately blown by motor-driven centrifugal fans. The large amount of auxiliary power required for the resistance fans, for the blowing and excitation of the generators, and for other purposes, has necessitated the provision of an auxiliary generating set comprising a 100-h.p. A.E.C. diesel engine and generators. The auxiliary generator is connected in parallel with a 120 amp.-hr. battery which provides stand-by power in an emergency, and heating and lighting when the generating set is not running. Separate auxiliary generators driven from the same engine provide the excitation for the main generators and an alternating current supply; the auxiliary engine room is in the middle of each braking unit.

The bogies of the braking units are of the four-wheel pattern; each has two generators rated at 375 h.p. each. In the bogies of the low-speed unit the generators have suspension bearings and are supported by the axles as in a normal motor coach. In view of the weight of these generators, and the high speeds for which they are required, it is clearly undesirable for this arrangement to be used for the higher-speed units, as the large unsprung weight on the axle would have tended to damage or severely wear the track.

The generators of the medium- and high-speed bogies, therefore, are supported directly from the bogie frames by brackets, and the generator shaft is geared and connected to the axle by means of Andrews-English Electric flexible axle drives which were made by the railway under licence. These drives, which were specially developed for use in high-powered motor coaches, permit the axle to move vertically perfectly freely, as required by the suspension, and at the same time are self-aligning, and permit a certain amount of lateral movement to allow for clearances in the boxes, or distortion of bogie frame.

Speed Control

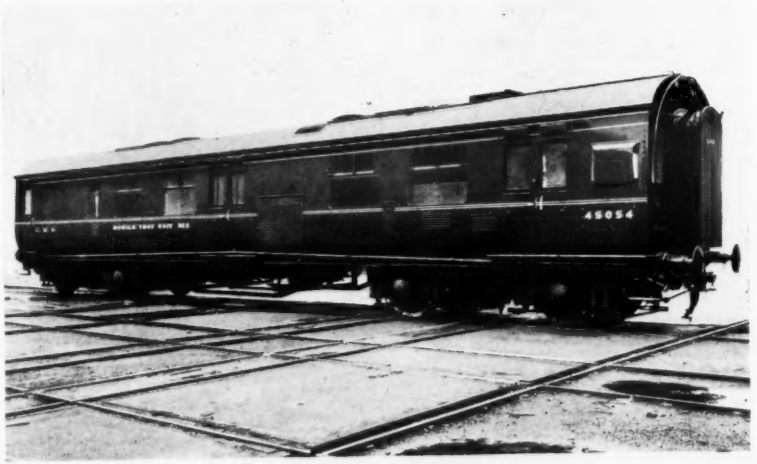
Considerable attention has been given to the design of the automatic control which regulates the loading of the main generators so that constant speed is obtained. On the dynamometer car a small tachometer generator is driven from the unflanged wheel, and generates a voltage proportional to the speed of the train. This is balanced against a fixed voltage representing the speed to be maintained, so that the difference represents the error between the actual and the required speeds. This voltage is amplified and transmitted down the train to the braking units, in each of which is a thyratron rectifier set controlling the main generator excitation. Stabilising devices are introduced to avoid the various forms of "hunting" that otherwise would occur. Each unit has also a master control so that it may be operated independently of the train if desired.

During 1939, several series of tests were carried out on a Class "4," 0-6-0 goods locomotive, and further tests were in hand at the outbreak of war. Measurements of the resistance at constant speeds of coaches of standard type are being made.

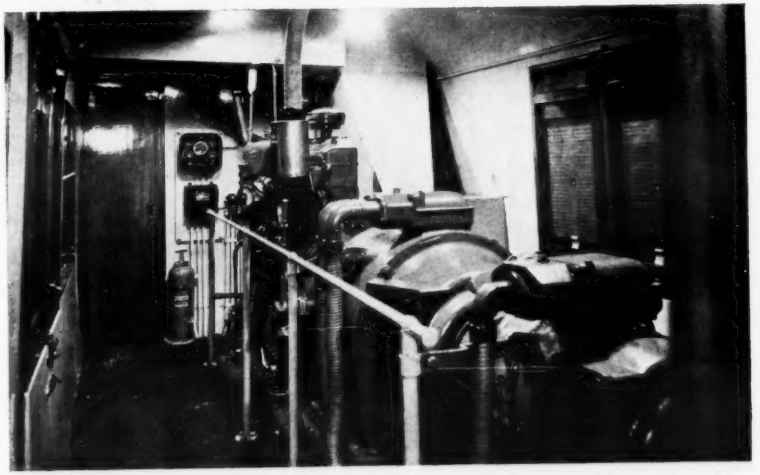
The basic principles of these units were evolved by Dr. H. I. Andrews, of the L.M.S.R. Research Department, and the subsequent development and construction was shared between the L.M.S.R. Chief Mechanical Engineer, who built the units in the Derby shops, and the British Thomson-Houston Co. Ltd., of Rugby, who supplied the main electrical and control equipment.

Other principal suppliers include the Associated Equipment Co. Ltd., J. Stone & Co. Ltd., the Chloride Electrical Storage Co. Ltd., British Timken Limited, David Brown & Sons Ltd., Ransome & Marles Bearing Co. Ltd., Jonas Woodhead & Sons Ltd., and the Telephone Manufacturing Co. Ltd. The principal instruments are obtained from Alfred J. Amsler & Co., Negretti & Zambra, the Cambridge Instrument Co. Ltd. and George Kent Limited.

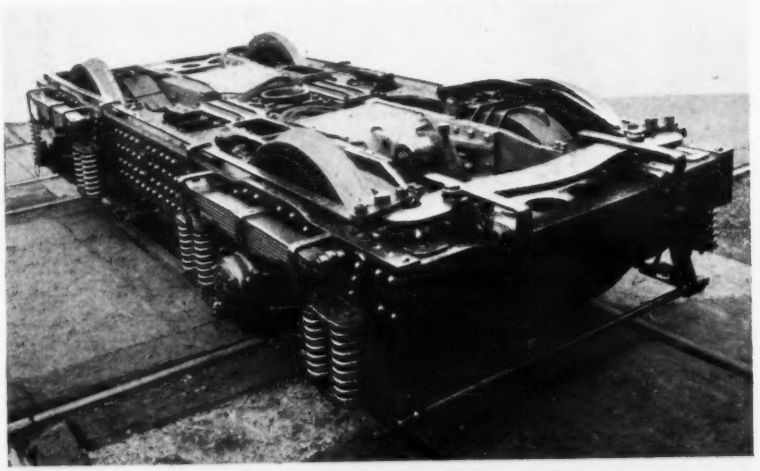
Testing Locomotives on the Line



One of the three braking units which, with a dynamometer car and special tender, make up the mobile testing plant



Interior of the auxiliary engine room, located in the middle of each braking unit



Generators of the medium and high speed bogies, which are supported directly from the bogie frames by brackets

Control compartment in which the principal controls of each braking unit are centralised

Engineering Library

Track Renewal on the Central Uruguay Railway

Use of mechanical means for the renewal of track on a single line

By D. G. MacCormack, B.Sc. M.I.C.E.,
Chief Engineer, Uruguay Railways

Levelling off road bed after track lifting

THE system evolved on the Central Uruguay Railway for the renewal of single-line track by mechanical means, permits the work to be carried out in the intervals of time available between regular trains; these intervals vary from 2½ to 4 hours depending on the intensity of traffic on the section to be renewed.

It was decided to pre-assemble the new track in a central yard and lay it with a ten-ton locomotive crane. A train was designed by the Way & Works Department, and made in the railway shops, five common 30-ton flat wagons being lengthened to hold a set of rail lengths.

As the train has to work on a single line, a system had to be evolved to pass the track lengths from the four rear wagons to that next to the crane. The winch of a two-ton disused crane was mounted on a two-axle flat wagon, to provide the hauling power; this wagon is marshalled next to the locomotive, which supplies the winch with steam by means of a hose. Four lengths of rails are

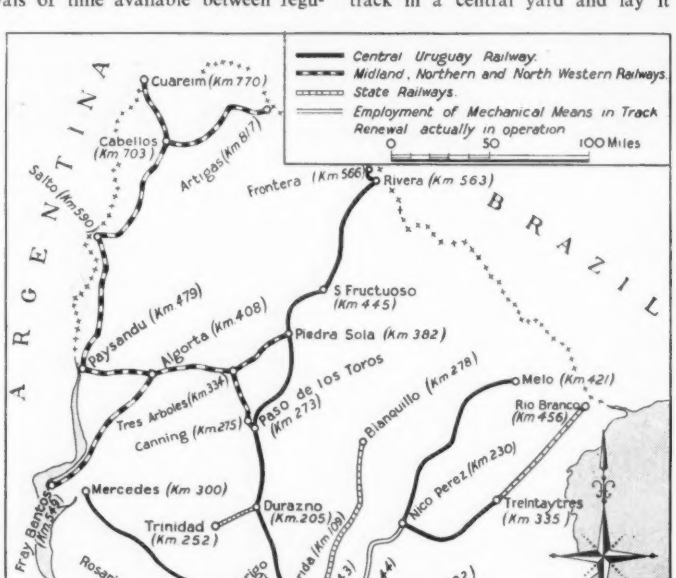
Crane lifting track

bolted down on the wagons, the two exterior ones to a gauge of 4 ft. 11 in. to bear the new rails, and the two interior ones to act as guides encasing the hauling cable.

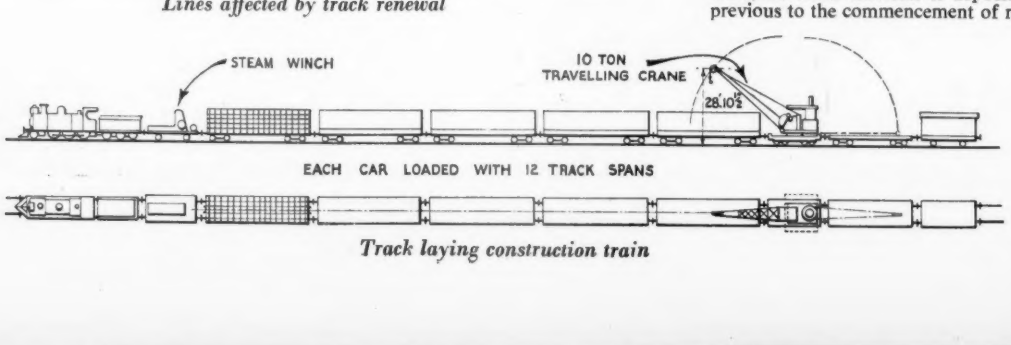
The space between the wagons is bridged by two short hinged rails. The cable runs from the winch along the five wagons, round a pulley fixed at the end of the wagon next to the crane, and back to the wagon holding the set of new rail lengths to be hauled, where it is fastened to them. When hauling old rail lengths, the cable runs direct from the winch to the rails, as these have to be pulled away from the crane.

The rails on the wagons are greased daily to facilitate sliding of the new rails, and four guides, which bear on the wagon rails, are bolted in the bolt holes at the ends of the bottom rail lengths, to keep these running straight when sliding. The crane with its jib-wagon and brake-van, completes the construction train unit; its capacity is 60 rail lengths, distributed in sets of 12 on the five wagons.

A station situated in the centre of the section to be renewed is selected as the construction yard; provisional sidings are laid, and if necessary, are given a cross-over road to facilitate movement. If possible, all track material is deposited here, previous to the commencement of renewals,



Lines affected by track renewal



Track laying construction train

as the reception of rails and sleepers during the work causes considerable inconvenience. In this connection sleepers are received already bored and adzed. New rail lengths are assembled as required in this yard, in layers of 12 to conform with the wagon loading. Ingersoll Rand compressed-air spike drivers are used for spiking. A 3-ton steam locomotive-crane is used for handling and placing sleepers and rails in position for assembly.

The Yard Gang

The yard gang consists of from 90 to 100 men, and includes a foreman and two gangs of from 35 to 40 men; each of these gangs is organised under a separate assistant foreman. One of the gangs handles all new materials, assembles rail lengths, and classifies all new rails and sleepers, cuts and bores short curve rails, and so on; this gang can assemble 70 rail lengths in an 8-hour day and attend to the other details described .

The second gang attends to the unloading, dismantling, classifying and handling of the old track material brought in by the works train; this gang can remove, classify, and pile some 787 yd. of track in a day. Thus the yard is kept in perfect order and no disorderly piles of material are left lying about. A pneumatic spike remover and a Nordberg track-wrench are used respectively for unspiking timber sleepers, and unbolting clips on steel sleepers.

Various labourers also are included in the yard gang, and amongst these are a craneman, a smith, a carpenter's labourer to cut wedges, a mechanic to attend the compressor, two watchmen, and two water carriers.

Preliminary Works

Before the removal of the old track and the relaying operation are commenced, certain preliminary works are undertaken.

One of these preliminary works is the making up of worn embankments, and where the banks are very narrow, they are reinforced ahead of the track renewal. The top of the embankment is widened, and carried up to underside of the old sleepers. This becomes the new formation level except in places where grading, a bridge, or other limiting structures do not permit this practice.

Some stretches of the old track were laid on soft formations into which the old ballast has sunk, causing water-pockets; in this way some of the banks have become completely waterlogged, and all such stretches are treated by separate gangs, ahead of the rewenal work. Also drainage pipes and culverts, generally are renewed or repaired ahead of the renewal.

On the site where the track is to be renewed, the ballast is removed from the old track to new formation level, and as the old track is lifted in sections of two rail lengths at a time, bolts are removed on alternate joints. Two old bolts are replaced wtih additional washers to expedite their removal during the cut. Joint sleepers, fishplates, and new bolts are distributed in front of their eventual position.

Two foremen and forty men, on an average, can prepare some 787 yd. of track in this way in eight hours.

The construction train leaves the station nearest the section to be renewed immediately the last train passes out of the section. When convenient, an intermediate portable block-post is established to allow the construction train to enter the section once the last train passes the site of the renewal.

On arrival at the site, the crane and brake van are separated from the train; lifting of the old track then commences. The 10-ton crane lifts out the old track, length by length, and the old rails are laid alongside; meanwhile the rest of the train moves forward, ahead of the renewal. The first two-rail lengths of old track are lifted three minutes after arrival of the train, and it then takes 25 to 40 minutes to remove some 787 yd. of old track, depending on ground conditions.

A lifting gang which is comprised of a foreman, fourteen men, a craneman, and a fireman attach and detach the chains, control the rails, and remove fishplates. The remainder of the gang follow the crane, and level the new road-bed.

Four minutes after the last section of old track is lifted, the first new rails are laid; two bolts for each joint are put in with additional washers. The time taken for laying the new track averages 1 minute 35 seconds per rail length, on straight track, and 2 minutes on curves; thus, on straight track, 60 lengths, about 787 yd., can be laid in aproximately 1 hour 35 minutes.

Finished track

In laying the new track, the crane travels under its own power, and is detached from the train, which follows some 30 ft. behind. The crane retreats to the train to collect the rails; this arrangement avoids the possibility of the train pushing the crane off the end of the new rails, and facilitates the work of aligning, and bolting up the track.

Rail Expansion Gap

To maintain the correct expansion gap in accordance with the prevailing rail-temperature, expansion shims are fitted at the joints, and the recently laid rail lengths are driven up tight by means of a rammer handled by six men. One man holds plates of soft mild steel between the rammer and new rail ends, so avoiding damage to them. This work also reduces the "drag" by the crane on the newly laid unballasted track.

The lifting and laying gang is composed of seventeen men for the lifting of old track, and forty-four men for the laying of new track.

When some 220 yd. of new track has been laid, the Foreman and six men of the lifting and laying gang pass on to make the finished alignment. One Nordberg motor track-wrench operated by a gang of three men follows the train, completing the bolting of fishplates. When the remainder of the gang, consisting of a further fifteen men has completed the levelling of formation, they pass on to shovel packing slack sleepers, fixing the joint sleepers and so on. The joint sleepers are not fixed to the rails in the yard, as the fishplates are slotted for the bolts to pass through them, and the holes have to be bored on site. The operation of closing the track usually takes about fifteen minutes.

Short rails of various lengths are deposited at the end of the renewal and are used to make up the required length. Two short pieces of new rail are placed between the old and new track to prevent batter of the new rail-head at the junction. These short rails are re-used on successive cuts.

After closing, the construction train proceeds to load up the old track if there is sufficient time; a full train can be loaded in 1 hour 10 minutes. The total time taken at the site on straight track to renew some 787 yd., excluding loading up of the old track, is between 2 hours 30 minutes, and 2 hours 40 minutes.

Curved Track

As the joints are laid square, short rail lengths must be inserted where the track is curved. These are loaded in the works train in their correct position, and a diagram for all curve radii is given to the foreman to enable him to do this. It is not advisable to haul the track lengths on the wagon on curved track, and consequently the train has to return to straight track for this operation. As the curves in general are very short, this has not been difficult. All curves are string-lined. Ballast is unloaded from hopper trains after the new track has been laid, and the ballasting is carried out in three lifts, 9½ in. of crushed stone below the bottom of the sleeper.

Before the line is reopened for traffic, the train returns to the construction yard where new rails are loaded in readiness for the next renewal. Whenever possible, the construction train is hauled by the ballast train engine, as this avoids putting back at slow speed to the nearest station, with the corresponding loss of time.

(*See also illustrations, pages* 268 *and* 269)

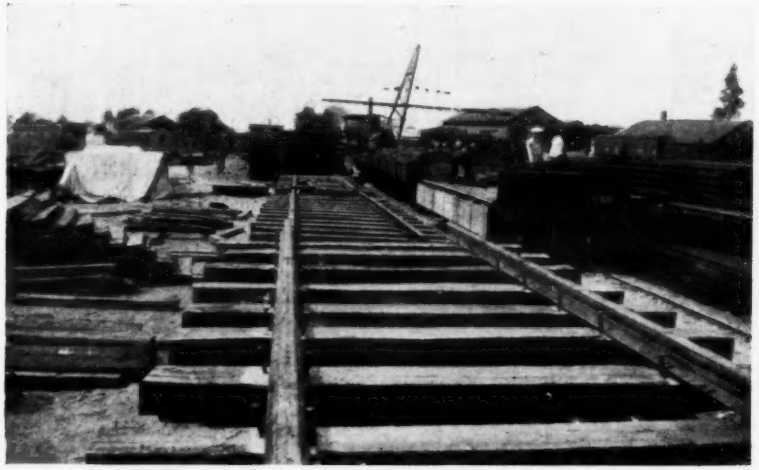
AUSTRIAN FEDERAL RAILWAYS OPERATING RESULTS.—According to recent particulars from an official source, the present performance of the Austrian Federal Railways amounts to 75 per cent. of the pre-war operations on the electrified lines, but on the steam-worked lines the ratio is 30 per cent. The Federal Railways now have 50 per cent. more locomotives than at the end of 1937, when they numbered 2,237 (steam and electric), but only 45 per cent. of the present stock is in serviceable condition. In the last year of its pre-war independence, Austria had 8,000 passenger coaches and 35,000 goods wagons. So far the Allied Control Commission has been able to allot to Austria only 5,000 coaches and 25,000 goods wagons, and the doubtful ownership of a great number of vehicles is stated to be a handicap in the economic reconstruction of the country. The worsening of the economic and transport position is emphasised by the fact that the average turn-round of a goods wagon is at present ten days, as against five days some time ago. Receipts of the Austrian Federal Railways have some curious features. As compared with 1937, when passenger receipts totalled Sch. 139 million, the total in 1946, at Sch. 276 million, was nearly double; but goods receipts, Sch. 317 million in 1937, were more than 50 per cent. lower in 1946, totalling Sch. 116,000,000.

Track Renewal on the Central Uruguay Railway

(*See article on page* 266)

Track lengths assembled in tiers in construction yard

Placing outer row of spikes during track assembly



Rails laid with spikes in position for driving

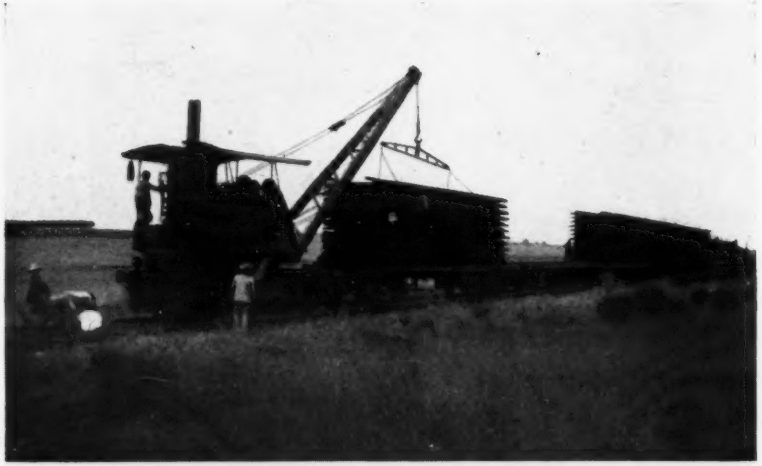
Dismantling old track in construction yard

Rails laid with spikes in position for driving

Dismantling old track in construction yard

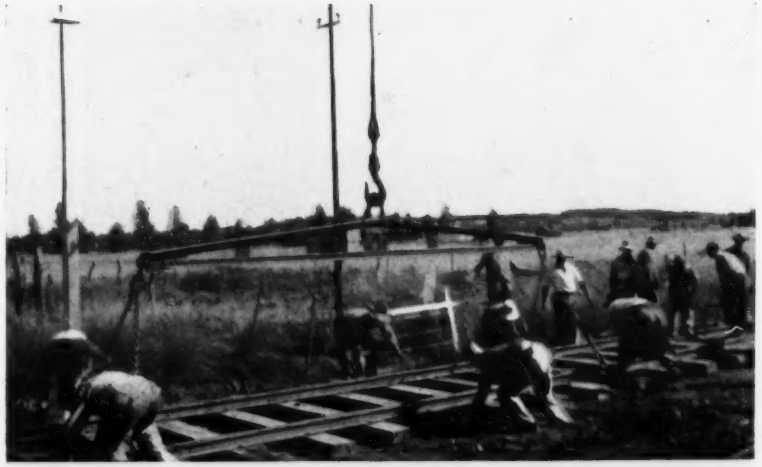
Track Renewal on the Central Uruguay Railway

(*See article on page* 266)



Crane collecting track from construction train

Laying track on to levelled road bed



Track length in position

Hopper wagon discharging ballast

In the "Devon Belle" Observation Car

Nearing Exeter, where the Plymouth and Ilfracombe portions separate, the down "Devon Belle" passes Honiton. The observation car continues to Ilfracombe

Another view in the observation car, showing how the wide and deep windows enable the West Country landscape to be seen to the best advantage

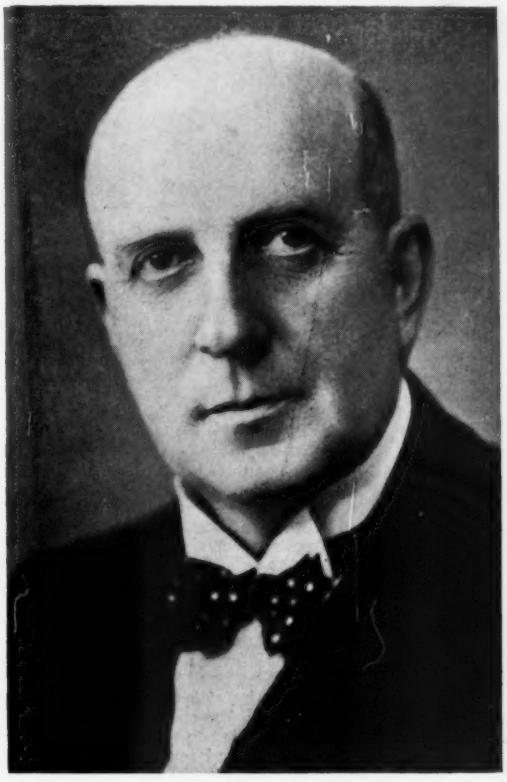
Photos [Felix Man

RAILWAY NEWS SECTION

PERSONAL

Mr. George Morton, who has held the post of Chief Accountant of the L.M.S.R. for the past ten years, has been appointed a member of the L.M.S.R. Executive Committee, retaining his position as Chief Accountant.

The Hon. Frederick Claud Sturrock, M.P., M.I.Mech.E., M.Inst.T., Minister of Transport, Union of South Africa, who has contributed a foreword to the publication (to which we make reference in an editorial article this week) entitled "The South African Railways: History, Scope and Organisation," was born in 1882. He served his apprenticeship as an engineer in Scotland and became an engineer on the staff of the Dundee Tramway Company on completion of his articles. He went to South Africa in 1907, where he purchased the engineering business of Wm. Blane & Sons in Johannesburg. He was also engaged in the coal trade in the Union, and was at one time President of the Association of Chambers of Commerce of South Africa, and a member of the Education Administration Commission. Mr. Sturrock has been M.P. for the Turffontein Division of Johannesburg since 1929; he was Minister without Portfolio, 1937-38, and became Minister of Railways & Harbours in 1939. When a Ministry of Transport for the Union was created in 1943 he became the first Minister of Transport. He is a member of the United Party.



The Hon. F. C. Sturrock
Minister of Transport, Union of South Africa

Mr. William Marshall Clark, O.B.E., B.Sc. (Eng.), M.I.C.E., M.Inst.T., General Manager of the South African Railways & Harbours, a publication on the history, scope and organisation of which is referred to elsewhere in this issue, is at present in England, after having attended the International Railway Congress at Lucerne. He is a son of Mr. W. H. Clark, who was a well-known railway engineer. Mr. Marshall Clark started his railway career as a pupil engineer in 1921, after having graduated in engineering at the University of Cape Town. After he had served for a number of years on construction and maintenance work, he took charge as Resident Engineer of a new works office controlling all major new works on the Witwatersrand, established at Germiston. In 1940 he was entrusted with the task of forming and equipping units to comprise the Railway & Harbour Construction Battalion (S.A.E.C.); he served with that battalion in East Africa, as Second-in-Command, and later proceeded to Egypt, where the battalion was reformed into a Railway Construction & Maintenance Group (S.A.E.C.), of which he became Officer Commanding with the rank of Lt.-Colonel. Shortly afterwards he proceeded to Palestine and Syria, where he undertook the construction of the section between Haifa and Beirut (85 miles) of the strategic Haifa-Beirut-Tripoli Railway. For distinguished services in the Middle East he was made an O.B.E. During his absence on active service Mr. Marshall Clark was appointed System Engineer, Durban, and subsequently Inspecting Engineer, New Works, Johannesburg. On his recall to civil duty in 1942, he was transferred to the General Manager's Office as Chief Works & Estates Officer. Later he was made Controller of Ship Repairs and in October, 1943, became Chief Technical Officer (Reconstruction). Mr. Marshall Clark was appointed General Manager in October, 1945.

Mr. W. Marshall Clark
General Manager, South African Railways & Harbours

Mr. A. E. Tattersall, M.I.E.E., F.Inst.P., who, as recorded in our August 22 issue, is retiring from the position of Assistant Chief Engineer (Signals), L.N.E.R., began his railway career in the Signalling Department, Lancashire & Yorkshire Railway. In 1906 he was appointed Chief Assistant to the Signal Superintendent, Great Southern & Western Railway (Ireland), but in the next year joined the Metropolitan Railway as Signalling & Electrical Assistant to the Engineer, where he was responsible for the change-over from mechanical to all-electric power and automatic signalling throughout the electrified area. He was connected also with the installation of automatic signalling on the East London Railway; the latter and the Baker Street installation were the first in this country where a.c. track circuits were employed on a large scale. During his service with the Metropolitan Railway, Mr. Tattersall was responsible also for dispensing with the usual facing point locking bar in track-circuited installations, a practice which since has become universal. From 1915 to

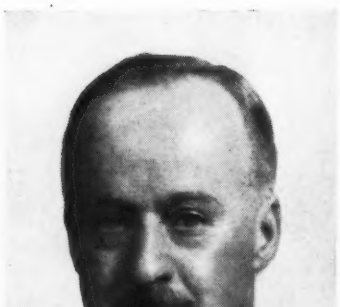
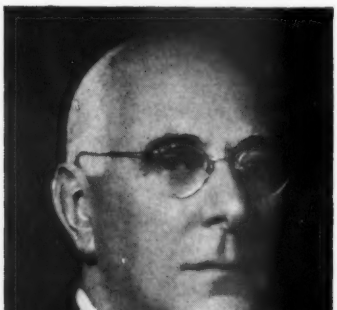


Photo [*Lafayette*

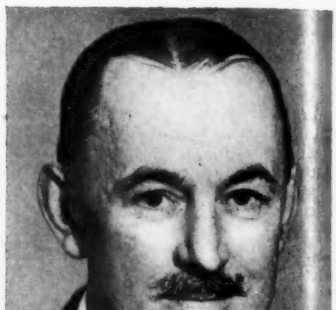
Mr. A. E. Tattersall

Assistant Chief Engineer (Signals), L.N.E.R., 1943-47



Mr. John Wilson

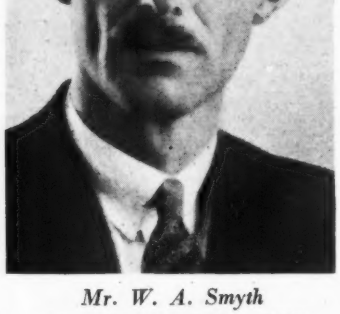
Director & General Manager, Entre Rios and Argentine North Eastern Railways, who has retired from the General Managership



Mr. Trevor Davies

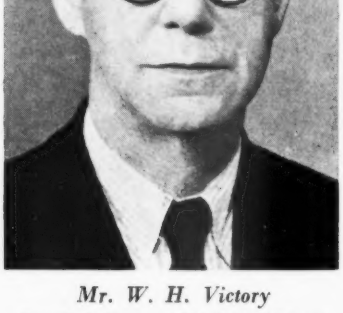
Appointed Accounts Officer, L.P.T.B.

1919 he held a commission in the R.A.O.C.; and in January, 1921, he was appointed Signal Superintendent to the Engineer, Great Northern Railway, in which position he was responsible for the introduction on a large scale of power-operated outlying points and signals, and for the reversible working and three-position signalling through the Gas Works Tunnel at Kings Cross. In 1924 he became Assistant Signal Engineer, Southern Area, L.N.E.R. In 1925 he was transferred to York, and in 1928 was appointed Signal & Telegraph Engineer, North Eastern Area, an appointment which marked a new development on the L.N.E.R., where previously separate officers had been responsible for signals and telegraphs. Subsequently Mr. Tattersall was responsible for the design and supervision of the installation of colour-light signalling on the main line between York and Northallerton, and elsewhere; this represented the introduction to this country of route relay interlocking; phase-controlled track circuits; white light shunt signals; and the junction indicator. He was associated also, in the N.E. Area with the introduction to this country of approach lighting, intermittent track circuiting for the control of single line, and with the extended use of mechanical colour-light signals. He was responsible for the installation of a new method of branch line signalling on the Boroughbridge branch, and for the introduction of carrier wave telephony and modern teleprinters between York and Newcastle. In 1936 Mr. Tattersall took up the duties of Signal & Telegraph Engineer, Southern Area. He was responsible for the successful conversion of the majority of the Southern Area telegraph trunks to a teleprinter network and automatic switching in connection therewith. He was responsible also for the introduction of the sequence switch interlocking, a recent development in circuit interlocking, which has been installed at Doncaster. He was appointed Assistant Chief Engineer (Signals) in 1943. Mr. Tattersall was elected a Fellow of the Institute of Physics in 1933, in recognition of his pioneer work in railway signalling; was President of the Association of Railway Companies' Signal Superintendents & Engineers, 1919; and is a member of the Signal and Telegraph Sections of the Association of American Railroads. His book, "Modern Developments in Railway Signalling," was published in 1921 by *The Railway Gazette*. He has been keenly interested in the training of the staff both in the N.E. and Southern Areas, L.N.E.R.; in fact, the Signalling School at York is one of the finest of its kind. The course of lectures given to the staff in those areas was so successful that they were reprinted in book form, under the heading "Railway Signalling and Communications" (published by *The Railway Gazette*). Mr. Tattersall has contributed also many papers on signalling to the proceedings of learned societies, and several articles from his pen



Mr. W. A. Smyth

Appointed Production Engineer, C.M.E. Department, L.N.E.R.



Mr. W. H. Victory

General Assistant to Chief Docks Manager, G.W.R., 1945-47

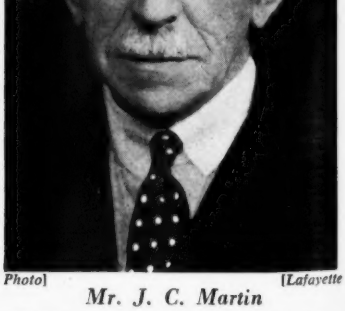


Photo [*Lafayette*

Mr. J. C. Martin

Tunnelling Assistant to the Chief Engineer, L.P.T.B., who has retired

have appeared in our columns. He was awarded a Webb Prize by the Institution of Civil Engineers for his paper, read before that Institution in 1942, on "Railway Signalling and Communications."

Mr. John Wilson, O.B.E., M.I.E.E., M.Inst.T., who, as recorded in our August 8 issue, has retired from the General Managership of the Entre Rios Railways and the Argentine North Eastern Railway, and has returned to London to take up his position on the boards of those companies, to which he was elected in January, 1946, received technical training at the Glasgow & West of Scotland—now Royal—Technical College, Glasgow. He became Resident Engineer for the North Metropolitan Electric Supply Company in 1907, and in 1910 he joined the staff of British Brown Boveri Limited, London, and was engaged in supervising the erection of plant, and as the firm's Representative Engineer in the North-East Coast area. In 1914 Mr. Wilson was appointed Electrical Engineer, Buenos Ayres Western Railway, and was placed in charge of all construction work for the electrification of the suburban section of that railway. He volunteered for war service, and obtained a Captaincy in the Royal Engineers in 1917, and was employed at the War Office. In 1918 he was transferred to the Royal Marine Submarine Miners and subsequently to the Admiralty Anti-Submarine Research Station at Shandon. He was made an O.B.E. for his services, and was demobilised in 1919, when he returned to his former post in Argentina. In 1927 the Electrical Section of the C.M.E. Department was constituted as an independent department with Mr. Wilson as Chief Electrical Engineer. He was appointed Traffic Manager in 1930, and, when, in 1933, the Buenos Ayres Great Southern and Buenos Ayres Western Railways were re-organised with a unified system of traffic operation, he was selected as Traffic Manager of the two systems jointly. In 1936 Mr. Wilson was appointed General Manager of the Entre Rios Railways and the Argentine North Eastern Railway; he was elected in January, 1946, to the boards of those companies, on which he is continuing to serve. Since returning to London, he has been appointed Technical Director of the United Railways of the Havana.

Mr. Trevor L. Davies, Costs Officer, L.P.T.B., who, as recorded in our August 1 issue, has been appointed Accounts Officer, was educated at Swansea Grammar School. He passed the examination of the Incorporated Secretaries Association, and, after serving with the Royal Engineers in the 1914-18 war, he held commercial appointments. Mr. Davies joined the East Surrey Traction Co. Ltd. as Secretary & Accountant in 1927; and from 1930 he held similar appointments with London General Country Services Limited and Green Line Coaches Limited. On the formation of the L.P.T.B. in 1933 he was appointed Accounts Officer (Reigate), and later became successively Assistant Audit Officer, Assistant Treasurer, and Costs Officer.

Mr. W. A. Smyth, M.I.Mech.E., M.I.Loco.E., who, as recorded in our June 13 issue, has been appointed Production Engineer, Chief Mechanical Engineer's Department, L.N.E.R., was educated at Mountjoy School, Dublin, and the Royal College of Science of Ireland, and served a pupilage with the Midland Great Western Railway, Ireland, on which subsequently he was employed as a junior draughtsman and as Running Shed Foreman. On the amalgamation of the Irish railways he was appointed Assistant District Locomotive Superintendent, Limerick, Great Southern Railways, and later returned to headquarters as Assistant Works Manager in charge of the Progress Office and of locomotive repairs at Inchicore Works. In 1929 Mr. Smyth joined the Ceylon Government Railway as Assistant Mechanical Engineer (Manufacture), a post established in connection with the design and equipment of the new locomotive, carriage and wagon workshops at Ratmalana. He was subsequently promoted Deputy Mechanical Engineer, and finally Mechanical Engineer. During that period he was closely connected with the design of the diesel-electric articulated trains now running on the coast line of the C.G.R. Returning to England in 1937, Mr. Smyth joined Associated Industrial Consultants, and was employed on reorganisation work in many industries and the introduction of production control, time study, incentive schemes and improved manufacturing methods. His services also were lent to an associated company on behalf of which he carried out a six months survey of the office and workshop methods of the Iraqi State Railways at Baghdad. Mr. Smyth later joined Guest, Keen & Nettlefolds Limited (Screw Department) as Deputy General Works Manager, and later was promoted General Works Manager, the position he has now resigned to return to railway work.

Mr. William Harris Victory, General Assistant to the Chief Docks Manager, Great Western Railway, who, as recorded in our August 29 issue, has retired, entered the service of the Newport Harbour Commissioners in 1897. In 1901 he joined the Alexandra (Newport & South Wales) Docks & Railway Company, which then owned Newport Docks and a railway connecting with the South Wales coalfield, in the General Manager's Office. He was with that company during a period of considerable developments at Newport Docks; these included large additions to the dock area, and construction of the South Dock lock, 1,000 ft. long by 100 ft. wide, opened in 1914. Mr. Victory served in several departments of the company, and was in charge of a section of the General Manager's Office when, in 1922, the amalgamation with the Great Western Railway took place. He was then posted to the newly-created Chief Docks Manager's Department at Cardiff as Principal Clerk in the Commercial Section. In 1926 he was appointed Chief Clerk, Chief Docks Manager's Office; in 1938 he became Assistant to the Chief Docks Manager, and in 1945, General Assistant. As a representative of the G.W.R. he has been a member of the Newport Harbour Commission and of the Cardiff and Newport Chambers of Commerce; he was Chairman of the Commissioners in 1940, and President of the Newport Chamber of Commerce for 1945.

Mr. James Cecil Martin, O.B.E., M.I.C.E., Tunnelling Assistant to the Chief Engineer, L.P.T.B., who, as recorded in our August 29 issue, has retired, has given the greater part of his life to the design and construction of London tube railways. Mr. Martin served an apprenticeship in the Civil Engineering Department of the Great Northern Railway, and later spent a brief period in Argentina as Assistant Engineer with the Buenos Ayres & Pacific Railway. He subsequently became Chief Assistant to the late Sir Harley H. Dalrymple-Hay on the construction of the Bakerloo, Hampstead and Piccadilly tubes (1903-07); the Hendon to Edgware extension of the Northern Line (1923-24) and its connection to the Northern City lines at Camden and Kennington (1924-26); and the extension of the Piccadilly line from Finsbury Park to Southgate (1932-33). During the past twelve years, Mr. Martin has prepared schemes for the Board's 1935-40 new works programme (suspended during the war); and he has been concerned in many other major engineering works. He designed every station and supervised the sinking of every shaft for the Post Office (London) Railway; was charged with L.P.T.B. interests in the construction of the eight Home Office deep-level shelters in London built to "tube railway pattern" in 1940-43; and devised schemes for urgent protective works in connection with Underground railways before the erection of permanent floodgates during the war. In 1932 he was a member of the commission which went to the U.S.S.R. to advise on the construction of the Moscow Underground; for his services he was one of the recipients of a special Order of Recognition from the Government of the U.S.S.R. Mr. Martin is a Fellow of the Permanent Way Institution. He served as a Major in the Royal Engineers in the 1914-18 war, and was made an O.B.E. for services rendered as Chief Engineer of the National Shipyards in the Bristol area.

We regret to record the death on August 28, in his 53rd year, of Sir Harold Kenward, a Director of the Dunlop Rubber Co. Ltd.

We regret to record the death, at the age of 79, of Mr. Robert Catherwood Wallace, M.I.C.E., M.Inst.T., who was Chief Civil Engineer, South African Railways, from 1920 until his retirement in 1928.

L.N.E.R. Staff Changes

Mr. W. M. Gracie, Assistant Goods Manager (Southern Area), who has been seconded to the Ministry of Food since 1941, will retire from the railway service on September 14.

Mr. A. A. Harrison, who has been Acting Assistant Goods Manager (Southern Area), is to be confirmed in the post, in succession to Mr. Gracie.

Mr. H. J. Edwards, who has occupied in an acting capacity Mr. Harrison's permanent post as Assistant Goods Manager (Rates), also is to have his acting appointment confirmed.

Mr. C. J. Barkway, District Inspector, Rickmansworth, has been appointed Goods Agent, Watford.

We regret to record the death, at the age of 68, of Major H. E. Hickmott, who retired from the Managing Directorship of Ribble Motor Services Limited in December, 1944, and relinquished his seat on the board in February, 1946.

Mr. G. D. S. Alley, District Engineer, Abergavenny, L.M.S.R., who, as recorded in our August 8 issue, has been appointed District Engineer, Derby (South), took the four-year engineering course at the Royal College of Science, Ireland, and obtained the diploma there; he also graduated in engineering at the National University of Ireland. Mr. Alley joined the L.M.S.R. in 1925 in the Divisional Engineer's Office, Crewe. After being Hallade Assistant to the Divisional Engineer, Western Division, for two years, he was appointed Assistant to the District Engineer, Abergavenny, in 1932. Having served in that capacity

under four District Engineers, he was transferred to Crewe in 1939, to Watford in 1942, and was promoted District Engineer, Abergavenny, in 1945.

We regret to record the death on August 18, at the age of 60, of Mr. Clarence Mannings Hill, a partner in the firm of C. M. Hill & Company, railway engineers and steel agents, London, which was founded by him on his return from the 1914-18 war, during which he served throughout in the A.S.C. Mr. Hill was well known in railway circles in London and in Belgium; his firm has represented the London and export interests of several prominent Belgian manufacturers for many years.

A dinner in honour of overseas visitors was held recently in connection with the Engineering & Marine Exhibition at Olympia. Lt.-Colonel Lord Dudley Gordon (President of the exhibition) took the chair. The toast of "Engineering the World Over" was proposed by Mr. C. Bentham (Past-President, British Engineers' Association), and responded to by the Hon. W. H. Kitson (Agent-General for Western Australia); and that of "Our Guests from Overseas" was proposed by Lt.-Colonel H. Riggall, and Mr. Habibullah (Commercial Representative, Pakistan) responded. The toast of "President of the Exhibition" was proposed by Mr. O. F. Brown (Department of Scientific & Industrial Research), to which Lord Dudley Gordon responded.

L.M.S.R. Staff Changes

Mr. A. I. MacMillan, District Engineer, Irvine, to be District Engineer, Crewe, in place of Mr. F. Everitt, retired.

Mr. C. H. Cole, Goods Agent, Walsall, to be Goods Agent, Wolverhampton.

Mr. J. L. Evans, Goods Agent, Soho, to be Goods Agent, Walsall.

Mr. E. O. Roberts, Goods Agent, Tipton, to be Goods Agent, Soho.

Mr. J. A. Downs, Chief Accounts Clerk, District Goods Manager's Office, Wolverhampton, to be Goods Agent, Tipton.

Mr. K. G. Bayes, Chief Clerk, Goods Department, Northampton, to be Goods Agent, Nuneaton.

Mr. H. G. Walker, Yardmaster, Nuneaton, to be Assistant District Operating Manager, Barrow (located Workington).

Mr. C. W. Peaple, Head Office Inspector (Freight Services), Office of Divisional Operating Manager, Crewe, to be Yardmaster, Nuneaton.

Mr. T. W. Royle, District Signalmen's Inspector, Barrow Hill & Staveley Works, to be Assistant to District Operating Manager, Rotherham.

Mr. V. L. Ward, Stationmaster, Derby, also in charge of Nottingham Road, to be Stationmaster, St. Pancras, from December 1, in place of Mr. F. G. Hewitt, retiring on November 30.

Mr. F. J. Mayall, Stationmaster, Burton-on-Trent, also in charge of Horninglow, to be Stationmaster, Derby, also in charge of Nottingham Road.

Mr. H. F. J. Lyons, Stationmaster & Goods Agent, Plaistow, also in charge of Upton Park, to be Stationmaster, Burton-on-Trent, also in charge of Horninglow.

Mr. R. J. Ritchie, Stationmaster, Rotherham (Masborough), to be Stationmaster & Goods Agent, Plaistow, also in charge of Upton Park.

Mr. F. Wayne, Head Office Inspector (Relief), Chief Operating Manager's Office, Watford (located Derby), to be Stationmaster, Stafford, also supervising L.N.E.R. passenger interests at Stafford (Town) and (Common).

Mr. C. P. Chatham, Deputy Parcels Agent, London (Euston & St. Pancras), to be Parcels Agent, London (Euston & St. Pancras).

Mr. G. W. Tomlinson, Chief Parcels Accounts Clerk, St. Pancras, to be Assistant Parcels Agent, London (Euston & St. Pancras).

Mr. H. Lyon, Chief Clerk, Passenger Department, Blackburn, to be Passenger Agent, Southport (Chapel Street).

Mr. A. Roper, Assistant District Controller, Barrow Hill & Staveley Works, to be Yardmaster, Barrow Hill & Staveley Works.

Mr. G. H. Thorpe, Yardmaster, Grimesthorpe, to be Yardmaster, Cudworth.

Mr. T. R. Chapelhow, Assistant District Controller, Gowhole, to be Yardmaster, Grimesthorpe.

Mr. T. E. P. Hallows, Yardmaster, Lawley Street, to be Assistant District Controller, Gowhole.

Southern Railway New Steam Coaching Stock

The first of 11 new six-coach steam sets for the Southern Railway London and Bournemouth services is expected to be placed in service early next week; the sets are being built in the Southern Railway Lancing and Eastleigh Works to the design of Mr. O. V. Bulleid, Chief Mechanical Engineer. Each train incorporates open and compartment-type vehicles, and contains seats for 66 first and 216 third class passengers.

Electric heating mats are fitted under the floor covering adjacent to each seat, and all corridors and lavatories are steam heated; in the restaurant cars additional floor space has been obtained by the provision of heater panels in the walls of the vehicles. The restaurant cars and kitchens have been designed to give passengers maximum comfort during meals, and at the same time to ensure that the meals are prepared in the most hygienic and up-to-date conditions possible during the train journey. The kitchen staff have their own room and toilet.

Industrial Wales Exhibition

The Industrial Wales Exhibition was opened officially at Olympia, London, on August 28 by Lord Portal, Chairman of the G.W.R. The opening ceremony was preceded by a luncheon, at which Sir Gerald Bruce, President of the Industrial Association of Wales & Monmouthshire presided.

Lord Portal, in declaring the exhibition open, recalled his visit to Wales in 1934 to prepare a report on what could be done to make life in the Principality less exclusively dependent on the prosperity of the coal, steel, and tinplate industries. At that time there was hardly a single light industry in Wales, but on looking round the exhibition today it might almost be said that Wales was self-supporting; it could almost run itself. Nevertheless, although the light industries diversified employment, it had to be remembered that the success of Wales used always to be founded on coal, and always must be.

Other speeches were made by Lord Hyndley, Chairman of the National Coal Board; Mr. J. W. Belcher, Parliamentary Secretary to the Board of Trade; and Mr. Thomas Griffiths, Minister of Pensions.

An illustration of the joint G.W.R. and L.M.S.R. stand at the exhibition was reproduced in our August 22 issue. The exhibition will be open daily (except Sundays) between 11 a.m. and 9 p.m. until and including September 13.

It was after Lord Portal (then Sir Wyndham Portal) had made his report on industry in Wales in 1934 that the Special Areas (Improvement & Development) Act was passed, under which Government assistance was given to the starting of new industries in the special areas, which included parts of South Wales. Lord Portal became also a trustee of Lord Nuffield's scheme for assisting the depressed areas.

The Mysore State Railway

(*Concluded from page* 261)

the total capital at charge was Rs. 6,84,29,000 (£5,137,500), and gross earnings in 1944-45 amounted to Rs. 1,64,18,000 (£1,231,350); working expenses were Rs. 1,08,24,000 (£811,800), and net earnings Rs. 59,94,000 (£419,550). The operating ratio of working expenses to gross earnings was thus just 66 per cent.

Locomotives and Rolling Stock

Latest returns available show that rolling stock consists of the following:—

	Metre-gauge	Narrow-gauge	Total
Locomotives ...	86	18	104
Coaching vehicles ...	318	35	353
Goods vehicles ...	1,494	148	1,642

The stock is up to date, and includes 4-6-2 passenger and 2-8-2 goods locomotives. Working mail and passenger trains on the Harihar and Hindupur lines from Bangalore, the 4-6-2s haul up to 14 bogies, weighing about 350 tons, at speeds up to 45 m.p.h. The 2-8-2s handle 550-ton goods trains at speeds of 25 m.p.h. Both types are fitted with double-bogie tenders, and the following are their leading dimensions:—

	"YB" (4-6-2)	"YD" (2-8-2)
Cylinders (2) : dia. ...	16 in.	17 in.
stroke	24 in.	24 in.
Boiler pressure ...	180 lb. per sq. in.	180 lb. per sq. in.
Grate area	23·1 sq. ft.	26 sq. ft.
Heating surface :—		
Tubes	1,045 ,,	1,258 ,,
Firebox	124 ,,	133 ,,
Superheater	265 ,,	310 ,,
Total	1,434 ,,	1,701 ,,
Tractive effort at 85 per cent. boiler pressure	16,492	22,100
Tender capacities—		
Water	3,000 gal.	3,000 gal.
Coal	8 tons	8 tons
Weight in working order—		
Engine...	51·8 tons	56·6 tons
Tender	37·7 ,,	37·7 ,,

All passenger and 54 per cent. of the goods vehicles on the metre-gauge lines are fitted with automatic brakes. All carriages are lighted by electricity, and are well equipped and comfortable.

In one minor respect the Mysore State Railway is unique among the Indian Class I lines, namely that of the 8,331 employees none are Europeans, though there are 50 Anglo-Indians or domiciled Europeans.

For half a century the Mysore Government has been endeavouring to obtain a concession to develop a port on the west coast as an outlet for its trade. The port favoured, and also recommended by the Government of India Ports Technical Committee in its recent report, is Bhatkal. As will be seen from the map, the Mysore frontier is within 15 miles of the coast at Bhatkal, which would be connected with the Mysore State Railway system by a short extension, which would, however, be through difficult country in the descent from the plateau. Bhatkal is in Bombay Province just north-west of a point where the Mysore, Bombay, and Madras Presidency frontiers meet in a point. A fine deep-water harbour could, it is understood, be constructed at Bhatkal.

Ministry of Transport Accident Report

Gidea Park, L.N.E.R., January 2, 1947

LT.-COLONEL E. WOODHOUSE inquired into the accident which occurred at about 11.17 p.m. on January 2, 1947, at Gidea Park, L.N.E.R., when the 10.28 p.m. train, Liverpool Street to Southend, which was composed of eight bogie coaches drawn by 4-6-0 engine No. 1565, and was just starting from the station on the down through line, was run into in rear by the 10.25 p.m. train, Liverpool Street to Peterborough, composed of 6 bogie coaches, 2 bogie mail vans and a 3-bogie twin composite coach, drawn by 4-6-0 engine No. 1602. The last three coaches of the Southend train were demolished completely and the underframe of the eighth coach was carried forward, with three bogies, 120 yd. in front of the colliding engine, the sixth and seventh coaches being thrown bodily on to the adjacent up local line and its platform.

There was a good deal of other damage to the trains, but little to the permanent way and station. Five passengers were killed and two fatally injured; 45 received injuries necessitating detention in hospital, and a number of others were able to continue their journeys after treatment. Ambulances and medical attention were promptly available, and the last of the injured left at 1.40 a.m. There was a dense fog and the night was cold.

General Details

The accompanying diagram shows the lines, signals and other details involved in the accident. Between Romford and Gidea Park the line forms a transition section between the Sykes lock-and-block, in force from Liverpool Street to Romford inclusive, and the modern colour-light and automatic signalling below Gidea Park, the signals being controlled by continuous track circuiting without any manual block working, but with apparatus to ensure the signals being put to danger behind each train. Magazine train describers are in use from Romford, and if the signalman omits to describe a train as it passes, the occupancy of track circuit *N* (see diagram) causes a "not described" indication to appear at Gidea Park and the usual buzzer signal to sound.

The line rises steadily, though not steeply, in the down direction. There are fogmen's posts at all signals concerned in the accident except Crowlands home signal, with Clayton machines where required. In foggy weather, before the fogmen reach their posts, Romford may not accept a down train unless the line is clear to the starting signal, which gives an over-run of 1,115 yd. beyond the outer home. Similarly, although under normal conditions Romford advanced starting No. 18 can be lowered provided track circuits *N* and *N*1 are clear, giving a 440 yd. over-run beyond outer home No. 23, that distance can be increased to 1,660 yd. by operating a fog-switch in Gidea Park box, which adds track circuits *P*, *P*1, *Q*, *Q*1 and *Q*2 to the controls and extends them up to signals Nos. 15 and 25.

Fogmen had been called out at Crowlands box, by a message sent to Romford, at 8.50 p.m. but not at Romford itself and Gidea Park until 10.40 p.m. The man allocated to the Romford distants, Nos. 13 and 14, below Crowlands starting, was away from home when summoned by that box and did not report until 10.20 p.m. at Romford box on his way to them. It was uncertain at what time he reached his post and whether the Peterborough train exploded a detonator there or not.

There was no fogman at Romford outer home or onwards to Gidea Park when the accident took place. There was ample evidence about the density of the fog, which seems to have been thicker locally than nearer London. It led to the Peterborough train leaving there at 10.50 p.m., 25 min. late, and following, instead of preceding, the Southend train. The latter started punctually but lost 16 min. to Gidea Park. It was not practicable to turn it across to the down local at Romford, and it was arranged to do so at Gidea Park. The signals were cleared for this movement, as shown on the diagram.

The Course of Events

The driver of the Southend train found visibility worsening after Chadwell Heath, but managed to pick up Romford distant signal, which was "off," but saw no green light from the ground and concluded the fog post was not manned. The guard failed to identify the signal, but shortly afterwards saw someone carrying a lamp, whom he took to be the fogman on the way to his post, walking towards the signal on the far side of the down local line.

The driver saw Romford outer home, and his fireman the inner home, but did not see the advanced starting and the Gidea Park distant. He got, however, a fleeting view of the arms in the light from the firebox and located the footbridge by the steam beating down from its smokeplate. The outer home lights and banner signal beyond were seen.

The guard had a narrow escape, being about to grasp the handrail and enter his van when he heard the Peterborough train coming and remained on the platform. He thought at first that it must be on the down local, and in fact that the engine was under steam, though he could not be certain of that.

The Romford signalman, having accepted the Peterborough train, kept his signals against it, but pulled off the outer home when it actuated the rail-contact 100 yd. in rear, in accordance with Rule 39(*a*). He noticed the train had not reduced speed and was not stopping at the inner home, so he shouted and waved a lamp as the engine passed. He was positive that he cleared only the outer home, and when track circuit *B*1 became occupied he telephoned Gidea Park to say what had happened. It did not occur to him to use the speedier block bell, provided for emergency signals. There is no emergency detonator placer at Romford box, and although the signalman had no time to turn his handlamp to red before the train passed he thought he would have been able to get a detonator on the rail under the train, though perhaps not in front of the engine, had such apparatus been available.

The signalman at Gidea Park put his outer home No. 23 to danger when the Southend train reached the platform. The inner home—serving as platform starting—and its banner repeater, with the starting signal (through to local) No. 15, were

Wrecked rolling stock after the accident at Gidea Park on January 2, 1947

"off." On hearing that the Peterborough train had over-run the Romford signals he telephoned to the station, to try and get the Southend train started, but got no reply. There is some doubt whether, on sending for the fogmen, he operated the fog-switch, but as the Romford signalman did not pull off his advanced starting signal this point is of minor importance only.

Although his engine had left-hand drive and all signals from Crowlands, except Romford outer home, are on the left, the driver of the Peterborough train had more difficulty in locating them than the driver of the Southend train. He had received green hand-signals from fogmen on his way to Crowlands and had exploded a detonator on the London side of Stratford. He saw Crowlands distant at "clear" and no signals thereafter, but his fireman picked up Romford outer home at a range of 10 yd. and informed him it was "off."

Both men were positive they heard no detonator at the Romford distants. Although there was contradictory evidence from the fogman there, it is significant that no explosion was heard by an inspector

in the front coach, or the guard in the fourth, who was sorting parcels near an open window, or the Crowlands signalman, 219 yd. away.

The driver further maintained that he saw a green light, low down near Crowlands starting post, close to the through line, which he took for the fogman's lamp. He was unaware that the fogman's post was outside the down local and assumed he had a clear road through Romford, mentioning this to the fireman. He added that while looking for Romford inner home he saw another green light at a low level, which he judged to be where the fog post is situated. He saw no fogman —none was, in fact, there—and took the signal to be "off" for him, which it was not. No explanation of this green light could be found and a disc signal nearby, leading from the up local to a siding, was shown to have been at danger.

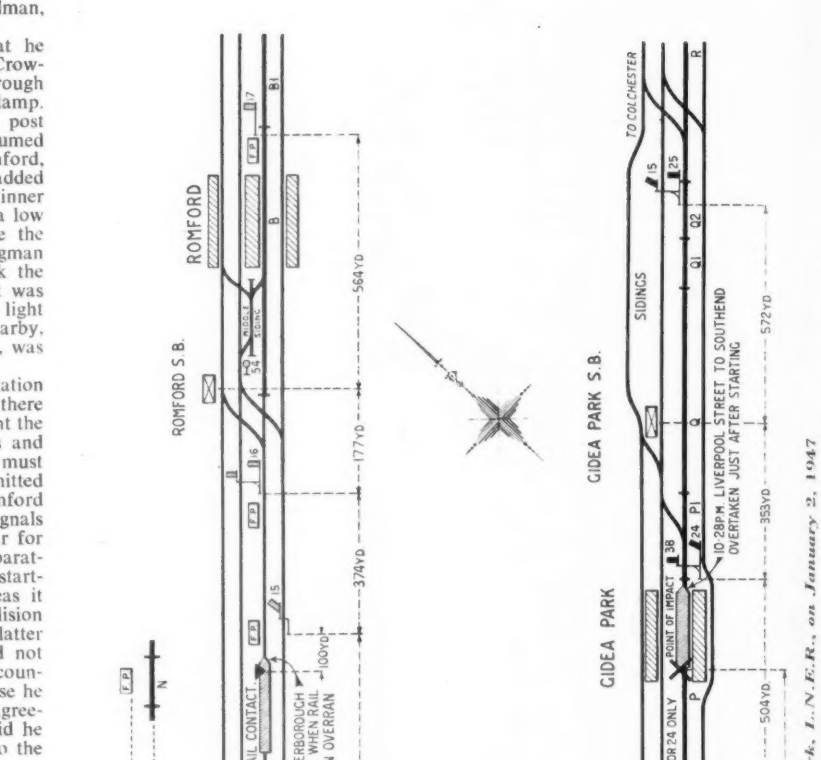
The driver identified Romford Station by its lights and estimated his speed there as 25 to 30 m.p.h., but a porter thought the speed was that usual for an express and that, in so dense a fog, "the driver must be running on his bangs." He admitted that he saw no signals between Romford and Gidea Park and got no hand signals leading him to believe they were clear for him. He estimated the distance separating Romford starting and advanced starting signals as 100 to 130 yd., whereas it is 386 yd. and said that when the collision occurred he was still looking for the latter and the Gidea Park distant. He did not notice the footbridge 269 yd. on the country side of that signal—possibly because he was running without steam—and in agreeing that he was momentarily lost said he could ascribe his misjudgment only to the density of the fog.

The lengthman acting as fogman at the Romford distants, summoned by the message from Crowlands at 8.50 p.m., when he was not at home, reported at Romford box at 10.20 p.m. and said he left about 5 min. later, taking about half an hour to get to the signals and walking alongside the down local. His further evidence was far from satisfactory and conflicting with that of other witnesses. He said he found a partly filled magazine in the hut and fitted it to the down through machine at once. Not long after, two trains passed in quick succession on that line and, the distant being "off" for the first one, he removed the detonator, which was exploded by the second, to which he showed a yellow light. A little later he went to Crowlands box for some more ordinary —not machine—detonators. The man last on duty at this post, however, assured Colonel Woodhouse that he returned the magazine to Crowlands on going off duty and was positive that none was left in the hut.

The signalman agreed that the magazines always were kept in the box, but did not notice how many were there when he came on duty or whether the lengthman collected one when he called, soon after the Peterborough train passed.

The lengthman said he had been unable to show a green light to the Southend train as the glass in his handlamp was broken. He had not attempted to exchange the lamp, which he could have done without difficulty. Later he got a green flag at Crowlands box, to put over the lamp and suggested this was an effective substitute for the missing glass. He had not thought to get a flag when at Romford.

A search near the Clayton machine next morning produced one clean and two decidedly rusty exploded detonator cases, and it was established that the breakdown



Circumstances of the collision at Gidea Park, L.N.E.R., on January 2, 1947

train exploded a detonator at that point on its way to the accident towards 2 a.m., as the lengthman agreed. He could not remember using any on the down through subsequently. Only three trains passed until the fog lifted at 5.30 a.m., separated by 40- to 60-min. intervals, and it is probable that the diverging distant, No. 13, was pulled off for them, which would be in accordance with the lengthman's statement.

Inspecting Officer's Conclusion

Though incidents in the Crowlands-Romford section had some bearing on the accident, Colonel Woodhouse considers its direct cause to be the serious mistake made by the driver of the Peterborough train in continuing to run at fairly high speed while uncertain of his location and in ignorance of the signal indications he was unable to see. Rule 127 (*xxii*) deals with such a situation in terms leaving no room for doubt, stating that if a driver cannot see fixed signals he is to assume that distant signals are at "caution" and stop signals at "danger" and must regulate his speed or stop accordingly, unless he receives a fog signalman's indication that the signals are at "clear."

Colonel Woodhouse considered the colliding driver's statement, to which he adhered when closely questioned, that when he ran into the Southend train he was still looking for Gidea Park outer distant, 1,412 yd. in rear but came to the conclusion that possibly the driver was confused at the inquiry and really meant that he was expecting to see Gidea Park outer home with inner distant below it. Once he had wrongly concluded that the Romford signals were clear for him, there was no reason why he should not run, though cautiously, as far as Gidea Park outer home. He may have formed this wrong impression either because he thought he saw a green hand signal at Romford distant, or because the outer home there was at clear when first seen by his fireman.

His assertions regarding green hand signals were unsupported by other evidence and, in recalling the incidents leading up to the accident, he may have persuaded himself that hand-lamp signals seen earlier were given to him at the Romford signals. Nevertheless, his own admissions and the effects of the collision lead to the conclusion that after passing Romford he showed a regrettable lack of caution by continuing to travel at a speed manifestly too high. Having regard to the density of the fog and absence of fogmen, a careful driver might have been expected to proceed at a crawl until certain of his location, and this serious error was the primary cause of the accident, for which the driver must be held responsible. He is 52, with 33 years' service, and has been a driver for 6 years. His record is good.

Colonel Woodhouse feels, however, that had he had a definite warning when approaching Romford that the stop signals there might be against him, or, in other words, if he had exploded a detonator at the distant signal, there would have been less likelihood of his subsequent mistake, and therefore the conduct of the lengthman calls for comment. His account of his actions was not convincing. There is no reason to doubt that the machine magazine had been left at Crowlands box by the last fogman doing duty at Romford distants. The detonator found recently used was accounted for by the breakdown train.

The Peterborough train had passed when the lengthman arrived at Crowlands box, and the inference is that he went there for the magazine almost as soon as he reached his post. If, as seems likely, he was the man seen going towards the post when the Southend train was nearer Romford, he could have reached it only a few minutes before the Peterborough train passed, though he gave no adequate reason for taking so long to get there. There was nothing to prevent him from leaving an ordinary detonator on the rail while he went to the box. From his excuses about his defective hand-lamp, he appears to have been carrying out his duties in a casual and unintelligent manner, and it is difficult to avoid the conclusion that his conduct indirectly contributed to the accident.

A false impression may have been conveyed to the driver by Romford outer home being at "clear" when first seen by the fireman. Had he known it had only just been pulled off in accordance with Rule 39 (*a*), it would have suggested to him that the following signals were at danger. The signalman was permitted to clear the signal when the rail contact was actuated, but Colonel Woodhouse feels that when visibility was so bad it would have been more prudent to wait until he was certain that it had been seen at "danger."

Remarks and Recommendations

Had there been a detonator-placer at Romford box, it is questionable whether the signalman would have succeeded in putting a detonator on while the Peterborough train was passing, and still more unlikely that he would have been able to do so before it reached his box. In fog and darkness he cannot have realised immediately that it was not stopping at the inner home. Nevertheless, the accident might have been averted had this apparatus been available, and used in accordance with Rule 94, which lays down that emergency detonator placers must be used always during fog or falling snow, when an approaching train requires to be stopped, whether a fog signalman is on duty or not. The driver's attention would have been attracted and any wrong impression about signal indications corrected as soon as he reached Romford box.

Attention was drawn to the value of detonator-placers by Sir Alan Mount and Lt.-Colonel Wilson in their report on the Ilford collision of January 16, 1944, recommending their provision, in accordance with the company's practice for new works, during the re-signalling for the London-Shenfield electrification. As it has not been possible to undertake this programme yet, and detonator placers are neither costly nor complicated, Colonel Woodhouse recommends that their provision at boxes in this area that still lack them be considered, preferably before next winter, having regard to the density of traffic, prevalence of fog, and the delay often occurring before fogmen reach their posts.

He thinks it probable that the accident would not have happened had colour-light signalling or automatic train control been in use. The advantages of colour-light signals are well known and they are particularly welcome when visibility is poor. The likelihood of one being passed unnoticed is fairly remote, especially at night, but experience shows that even they are passed occasionally unseen in fog, as at Ilford in 1944. But for the war, multiple-aspect signals would by now be in use between Liverpool Street and Gidea Park.

The only absolute safeguard is to supplement the lineside signals by sound signals, more reliable than the conventional manual fog-signalling arrangements, reinforced by a brake application if the driver fails to respond. The developments in this direction that have taken place since the Ilford accident include an improved adaptation of the 2-indication magnetic "non-contact" apparatus installed by the L.M.S.R. before the war on the London-Southend line, which does away with any possibility of confusion between "caution" and "clear" audible indications, such as might occur with the earlier pattern where speeds vary widely; and a modification of the well-known "contact" apparatus of the G.W.R. to provide three indications on the engine for use with multiple-aspect signalling. These forms of equipment are of the "intermittent" type.

The "continuous" type, providing on the engine at all times an indication of conditions ahead by miniature colour-light signals in the cab and a bell, sounding when the aspect shown becomes more restrictive, has been installed experimentally by the L.N.E.R. on a section between London and Hatfield. It is operated by coded current picked up inductively from the rails. Engine and track equipment are much more complicated and costly than in the "intermittent" types mentioned. The L.N.E.R. also intends to equip some signals between Marylebone and Neasden with the latest type L.M.S.R. and G.W.R. apparatus.

The advantages of automatic train control were stressed in the reports on the accidents at Ecclefechan and Bourne End, in July and September, 1945, and the question of the most suitable type for general adoption and any modifications needed to fit it for use with both multiple-aspect and semaphore signalling, has been under consideration by a committee of all companies. The recommendations are expected shortly.

Colonel Woodhouse trusts that these recommendations, coupled with the results of the tests by the L.N.E.R., will lead to the early provision of one or other system to assist drivers, at any rate, on busy sections of line in areas where fogs are frequent, such as that on which this accident occurred.

Poles for Outdoor Lighting

Stewarts and Lloyds Limited will show a representative selection of tubular steel lighting poles, for electricity and gas at the exhibition in Southport from September 15 to 19 of the Association of Public Lighting Engineers. These poles are of mounting heights in accordance with the Ministry of Transport recommendations for standardisation, and are of four main types:—

(1) Bracket arm type, suitable for main traffic routes, with mounting height of 25 ft.;

(2) Shepherd's crook type, also suitable for main traffic routes, with mounting height of 25 ft.;

(3) Swan-neck type, suitable for roads other than main traffic routes, with mounting height of 15 ft.; and

(4) Pillar type, suitable for roads other than main traffic routes, with mounting height of 13 ft.

The bracket arm and shepherd's crook types are available with side entry or pendant lanterns. The company's lighting poles are supplied either plain circular or fluted, and both forms of construction are to be shown. The poles, when erected, have no added ornament and present a slim, clean outline.

Notes and News

Technical Assistant Required.—A technical assistant is required by the Great Western Railway to take charge of its concrete products depot at Taunton. See Official Notices on page 279.

Harvest Traffic on G.W.R.—Working from dawn to dusk, Cotswold farmers during last week cut, dried, and threshed some 1,000 tons of wheat, which have been despatched by the G.W.R. to the mills at Bristol, Cardiff, Sharpness and Avonmouth.

Oil-Fired Locomotives on C.I.E. Excursions.—It was stated recently by Mr. L. Luke, Public Relations Officer of Coras Iompair Eireann (Irish Transport Company) that no coal was being used this summer on C.I.E. excursion trains. All these trains were being worked by oil-fired locomotives.

Murals at Gleneagles Hotel, L.M.S.R.—A series of six murals has been painted by Beatrice MacDermott for the L.M.S.R. hotel at Gleneagles, which was reopened recently. Each mural represents a scene from Scottish history or folklore, and they appear in the ground-floor hall, two of the lounges and on three landings.

Draughtsman (Civil Engineering) Required.—A draughtsman (civil engineering) is required by the Nigerian Government Railway for a tour of 18 to 24 months with prospect of permanency. Candidates must have had at least five years' experience in the drawing office, preferably of a civil engineering railway department or a firm of consulting engineers or contractors, with practice in railway work. See Official Notices on page 279.

L.M.S.R. Horses on Parade.—The L.M.S.R. inter-station horse parade (London District), to decide the smartest L.M.S.R. horse out of the 1,000 in the London stud, took place at Camden Goods Station, on August 23. The first prize was won by *Dolly*, a seven-year-old black mare of St. Pancras Goods Station, who was led by her driver, Carter Arthur Bugg. Twenty-seven horses took part in the parade, many of them prize-winners of smaller local parades. Colonel Sir John D. Laurie, Acting Lord Mayor of London, presented the prizes, accompanied by the City Sword Bearer, and Mr. F. Powe, Mayor of St. Pancras.

Aluminium Union Change of Address.—The Aluminium Union Limited announces its return, as from August 18, from Grosvenor House, Park Lane, to the Adelphi, Strand, London, W.C.2 (telephone No.: Temple Bar 3535).

Liverpool Overhead Receipts.—Receipts of the Liverpool Overhead Railway for the week ended August 24 were £3,205, an increase of £90. The aggregate for the 34 weeks to August 24, at £96,033, represents a decrease of £5,888 on the preceding year.

Inquest on L.M.S.R. Derailment.—On August 27 the inquest was resumed at Atherstone, Warwickshire, on four of the five victims of the derailment of an L.M.S.R. Manchester and Liverpool express at Grendon, Warwickshire, on July 21; a fifth man died at Tamworth. The inquiry into the derailment was reported in our August 1 issue. At the inquest a ganger said the coaches came off one at a time and the engine came off last; he thought the coaches pulled the engine off the line. The driver of the express said his engine gave a severe roll; he applied the brakes, and it seemed to steady itself. The engine then left the metals. He thought he would be doing 60 m.p.h. when he applied the brakes.

Travel Association on Tourist Restrictions.—At a meeting of the Board of Management of the Travel Association (the Tourist Division of the British Tourist & Holidays Board) held in London on August 28, the following resolution was passed: "That the Board of Management of the Travel Association (Tourist Division of the British Tourist & Holidays Board), appreciating the regret with which His Majesty's Government must have taken steps likely to affect adversely the post-war development of tourist traffic to this country, hopes that it will be possible to alleviate the restrictions now imposed upon hotels, caterers, and transportation services by next spring when the inflow of overseas visitors bringing foreign currency to Britain will start the 1948 tourist season. In the meantime the Travel Association urges that the Government should institute an immediate inquiry into the practicability of properly organised exchange travel and so avoid injury and loss, particularly to cross-Channel transport services."

Crompton Parkinson Traction Division.—With reference to the recent change of address of the London sales office of Crompton Parkinson Limited to Astor House, Aldwych, it is pointed out that the company's traction division remains at Chelmsford. This division deals with

Parade of L.M.S.R. London Van Horses

Colonel Sir John Laurie, Acting Lord Mayor of London, presenting prizes at the parade

British and Irish Railway Stocks and Shares

Stocks	Highest 1946	Lowest 1946	Prices Sept. 2, 1947	Prices Rise Fall
G.W.R.				
Cons. Ord.	61¼	54½	52	– 2
5% Con. Pref. ...	126½	107	113½	– 2
5% Red. Pref. (1950)	106½	102½	98½	–
5% Rt. Charge ...	140½	122½	127½	– 1
5% Cons. Guar. ...	137½	118½	125½	– 1
4% Deb.	129½	106	117½	– 1
4½% Deb.	129½	107	118½	– ½
4½% Deb.	130½	114	120½	–
5% Deb.	142½	125	130½	–
2½% Deb.	95½	81½	88½	–
L.M.S.R.				
Ord.	30¼	26½	27	– ½
4% Pref. (1923) ...	64	52½	56	– 1½
4% Pref.	86	75½	75½	– 2
5% Red. Pref. (1955)	105½	97	97½	–
4% Guar.	108½	100	97½	– 1½
4% Deb.	120	103	108½	– 1
5% Red. Deb. (1952)	108½	105½	101½	–
L.N.E.R.				
5% Pref. Ord. ...	7	5	6½	– ½
Def. Ord.	3½	2½	3⅛	– ⅛
4% First Pref. ...	59½	50½	52	– 1½
4% Second Pref. ...	29½	25½	26	– 1
5% Red. Pref. (1955)	104	97	93½	– 1
4% First Guar. ...	107	98	96½	– 1
4% Second Guar. ...	101	90	90½	– 2
3% Deb.	104	87½	94	– 1
4% Deb.	119½	102½	108	– 1
4½% Sinking Fund Red. Deb. ...	107½	101½	99½	–
SOUTHERN				
Pref. Ord.	79½	70	70	– 1
Def. Ord.	24	19½	22	– ½
5% Pref.	125½	107	113½	– 1
5% Red. Pref. (1964)	115½	106½	105½	– 1
5% Guar. Pref. ...	137½	119	125½	– 1
5% Red. Guar. Pref. (1957)	115½	107½	104½	– 1
4% Deb.	129½	105½	117½	– 1
5% Deb.	139½	125½	128½	–
4% Red. Deb. (1962-67)	113½	104½	104½	–
4% Red. Deb. (1970-80)	115½	104½	105½	–
FORTH BRIDGE				
4% Deb.	109	103	99½	–
4% Guar.	105	102	95½	–
L.P.T.B.				
4½ "A"	133½	120½	121½	– 1
5% "A"	142½	130½	130½	– 1
3% Guar. (1967-72)...	108	98½	97	–
5% "B"	128½	117½	117½	–
"C"	64½	56½	59½	– 1
MERSEY				
Ord.	34	30	32½	–
3% Perp. Pref. ...	76	69	68½	– 1
4% Perp. Deb. ...	117½	103	107	– 1
3% Perp. Deb. ...	98	81	90½	–
IRELAND*				
BELFAST & C.D.				
Ord.	8⅛	6	7½	–
G. NORTHERN				
Ord.	41⅞	30⅛	26½	–
Pref.	63¼	52	43	+ 1
Guar.	97½	78½	72½	–
Deb.	107	97½	96½	+ ½
IRISH TRANSPORT				
Common	19/2½	16/9	14/–	–
3% Deb.	107	100	101	–

* Latest available quotation

OFFICIAL NOTICES

Crown Agents for the Colonies

Applications from qualified candidates are invited for the following post:—

DRAUGHTSMAN (Civil Engineering) required by the Nigerian Government Railway for a tour of 18 to 24 months with prospect of permanency. Commencing salary, according to experience, in the scale £600, rising to £970 a year, including expatriation pay. Outfit allowance £60. Free passages. Candidates must have had at least five years' experience in the drawing office, preferably of a Civil Engineering Railway Department or a firm of Consulting Engineers or Contractors, with practice in railway work. A knowledge of the design and construction details of civil engineering structures and railway trackwork will be required, including the ability to take off quantities, prepare estimates and draft general specifications. Apply at once by letter, stating age, whether married or single, and full particulars of qualifications and experience, and mentioning this paper, to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1, quoting M/N/17417 on both letter and envelope.

TECHNICAL ASSISTANT required to take Charge of Concrete Products Depot, Great Western Railway, Taunton, which Depot is about to be modernised. Applicants should have experience of manufacturing a variety of pre-cast reinforced concrete articles and of testing cement and aggregates. Applications with full particulars and salary required, should be made to the CHIEF ENGINEER, GREAT WESTERN RAILWAY, PADDINGTON STATION, W.2

TRAFFIC CONTROL ON THE L.M.S.R. Co-ordination of operating arrangements as a result of grouping.—Central, Divisional, and District Control—Outline of unified methods adopted—Organisation and working—Control telephone circuits—Daily telephonic conferences. Paper. 12 in. by 9 in. 20 pp. Illustrated. *5s. By post 5s. 2d.*

PLASTICS IN RAILWAY ENGINEERING. By T. Lovatt Williams and D. Warburton Brown. *1s. By post 1s. 2d.*

DRAUGHTSMAN required with experience in the preparation of general engineering drawings for reproduction in technical journals. Good lettering essential. Write stating age, experience, and salary required.—Box 175, *The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

CONVERSION OF LOCOMOTIVES FROM COAL TO OIL BURNING. Ministry of Transport plan for converting 1,217 locomotives. Equipment of oil burning locomotives on the G.W.R., fully described and illustrated, which forms the basis of the scheme. Reprinted from *The Railway Gazette*, January 18, August 16 and 30, 1946. *Price 2s. By post 2s. 2d.*

4-8-2 CLASS "15F" LOCOMOTIVES FOR THE SOUTH AFRICAN RAILWAYS. The latest examples of these main-line passenger and freight locomotives have been built by the North British Locomotive Co. Ltd. Reprinted from *The Railway Gazette* of September 20, 1946. *Price 2s. By post 2s. 2d.*

electrical equipment for railways, diesel-electric vehicles, light railways, tramcars and trolleybuses. All inquiries relating to such equipment should be addressed to the traction division at Chelmsford.

Gloucester Railway Carriage & Wagon Co. Ltd.—The directors recommend the payment of a dividend for the year ending May 31 last of 15 per cent., less income tax.

Interim Index of Retail Prices.—The Ministry of Labour has issued the first figures compiled for the interim index of retail prices, which takes the place of the old cost-of-living index. With the level of prices on June 17 taken as 100, the figure for July 15 was 101.

George Cohen Sons & Co. Ltd.—Profit for the year ended March 31 last, including dividends from subsidiaries but before charging taxation, amounted to £545,892, as compared with £165,407 for the preceding year. After taxation, the net profit of £225,892 represented an increase of £132,936. The directors recommend a final dividend for the year of 8½ per cent. After payment of dividends, there will be £6,484 to carry forward.

Metropolitan Assented Stock. — A statement from Glyn, Mills & Company, the trustee and registrar of the Metropolitan Assented Stock, announces that funds in their hands available from the recent payment on account of interest on the underlying London Transport "C" stock are not considered sufficient to justify an interim payment on the assented stock. The funds, therefore, will be carried forward towards payment of interest for the year ending December 31 next in the same manner as was done a year ago.

Thomas De La Rue & Co. Ltd.—Mr. B. C. Westall, Chairman and Managing Director of the company, said at the annual general meeting that a large proportion of the proceeds from the recent increase in the company's capital was being expended on the extension of the two subsidiaries, De La Rue Insulation Limited, and De La Rue Gas Development Limited. There had been a diminution in the profits of the parent company, largely owing to the effect of the power cut last winter. Unless they had to face a worse position next winter than last, there was every reason to believe that the results for the current year would show a substantial improvement. The building of the West Chirton factory at Tynemouth of the De La Rue Insulation Company Limited was now complete. Results obtained so far at West Chirton were such as to justify the faith of the directors in this extension of the company's interests.

Classes in Transport.—Evening classes in transport subjects will be resumed at the City of London College, Moorgate, E.C.2, from September 22. The classes are available to prepare students wishing to sit for examinations of the Institute of Transport at the Graduateship and Associateship stages. There are also classes in road transport operation, finance, and engineering under the scheme of the National Standing Joint Committee on Road Transport Education. Enrolment may be made on September 15, 16, or 17, from 5 to 8 p.m.

Society of Engineers Examinations.—The scheme of professional examinations held by the Society of Engineers (Incorporated), which was suspended during the war, is being resumed this year. Examinations will be held during the first week of November, and subsequently in May and November. Each examination is in three sections—for civil, mechanical, and electrical engineers—and are held in two stages, qualifying for associate membership and graduateship. Further information may be obtained from the Secretary, The Society of Engineers, 17, Victoria Street, Westminster, S.W.1.

Guest, Keen & Nettlefolds Limited.—Sir Samuel Beale, in his statement circulated with the report and accounts at the annual general meeting of Guest, Keen & Nettlefolds Limited, said that during the year the output per man-hour of the company's factories had, in many cases, been increased by the introduction of new plant and better incentives. The introduction of the 5-day week had brought its problems, but very satisfactory outputs had been maintained. The board's policy had been to continue steadily with the provision of equipment of greater capacity and the most modern design in their finishing departments whenever this was wanted. Results were justifying this policy by an increasing ability to meet demands, limited only by steel supplies.

Power for Ships.—On August 27 a preview was given in London by Crossley Brothers Limited, Manchester, of an animated colour film entitled "Power for Ships," outlining the story of the Crossley scavenge pump diesel engine for marine use. Interior views taken at the works showed the erection of a medium-size 6-cylinder engine, and emphasised the chief points of the design, accessibility, and maintenance. A section of the film of particular interest explained the principles of loop scavenge and exhaust pulse pressure charging, the latter feature being the latest development in 2-cycle engine design. The film, which was produced by the National Film Agency, Manchester, is a feature of the Crossley exhibit at the Engineering & Marine Exhibition at Olympia. Crossley engines on view at Olympia include the HRT Vee-12 locomotive engine and the ERT6 rail traction engine designed for shunting locomotives.

Railway Students' Association.—On September 20 the Railway Students' Association will visit Toton Marshalling Yard, L.M.S.R. The party will leave St. Pancras at 8.55 a.m. and is due back the same day at 8.40 p.m. Two visits are being held in connection with G.W.R. goods working arrangements. Paddington Goods Depot was visited on September 4, and on October 4 the company's zonal scheme for miscellaneous consignments will be studied in operation at the Reading railhead. By permission of Mr. John Elliot, Deputy General Manager, Southern Railway, and Mr. A. C. Payne, Principal of the Southern Railway Staff Training College at Hook Heath, Woking, a week-end discussion group will be held at the college from October 25 to 27. The discussions, which will be led by Mr. M. A. Cameron, Assistant Passenger Manager, Southern Area, L.N.E.R., will cover the following subjects: Railway Policy in Respect of Charges; Efficiency and the British Transport Commission; and the Will to Work.

Forthcoming Meetings

September 10 (*Wed.*)—The Institution of Locomotive Engineers, a general meeting, at the Institution of Mechanical Engineers, Storey's Gate, London, S.W.1, 5.30 p.m. "The Westinghouse Empty and Load Brake with Straight Air Control: its Installation, Operation and Maintenance," by Mr. Brain Fawcett.

September 13 (*Sat.*)—The Permanent Way Institution (Manchester & Liverpool Section), at the Temperance Institute, 65, London Road, Southport, 2.45 p.m. Ten-minute lectures by members of the Section.

September 20 (*Sat.*).—The Permanent Way Institution (London Section), visit to the Kent & East Sussex Railway, also the Romney, Hythe & Dymchurch Light Railway.

Railway Stock Market

The piecemeal method adopted by the Government in announcing its plans to cope with the economic crisis has prevented stock markets from drawing a clear picture of the position and outlook. The prevailing uncertainty resulted in further selling of industrial shares, which again have fallen heavily.

Selling was not particularly heavy and in most cases was regarded as being much smaller than might be deduced from the extent of the further decline in values. In fact, because of the very small demand in evidence, jobbers have taken the precautionary course of marking down prices, and the marking down has been indiscriminate.

Yields in many instances therefore are attractive, and assuming there is no serious fuel crisis in the winter, many companies would seem to have reasonable prospects of maintaining their dividends, particularly as in numerous instances results for the current year will benefit considerably from the end of E.P.T.

On the other hand, although it would appear that many share values have fallen unduly in price, it would seem that the process of readjustment is unlikely until the Government's plans are disclosed fully. Apart from revision of export policy necessitated by the crisis, which may bear heavily on many companies (although others will gain materially if it is possible to achieve the higher export targets), it is rumoured that fresh priorities may be announced in regard to both iron and steel.

Contrasting with the further fall in industrials, British Funds have staged another rally under the lead of 2½ per cent. Treasury Bonds, gilt-edged stocks attracting more attention now it is difficult to assess the relative merits of industrial investments.

Home rails have again shown no response to the better trend in gilt-edged, although they are now, of course, virtually gilt-edged securities by reason of their right to exchange into British Transport stock. Moreover, it seems strange that with the prospects of a good capital profit (in view of the fact that current prices range down to as much as £12 below take-over prices), home rails continue to attract only very moderate attention from the public. Probably they would be in much better demand were it not for the extreme uncertainty now prevailing in markets generally. It is true that whereas a few weeks ago, the assumption was that the interest rate of British Transport stock would be 3 per cent., the view is gaining ground that after all it may be no higher than 2½ per cent. On the other hand, this would be achieved only were there an all-round advance in British Funds between now and the take-over in respect of home railway stocks. Terms of British Transport stock will have to be strictly in line with the general position of gilt-edged stocks ruling at the time of issue.

It has been mainly senior preference stocks which have moved lower in price on balance for the week, but there does not appear to have been much selling. In existing uncertain and inactive markets, moderate selling of any particular stock or share can lead to a sharp fall in price. There have been no heavy falls in home rails, declines ranging up to a point, whereas in the case of some industrial debentures quotations have lost several points on balance for the week. Junior stocks were fractionally lower where changed; apart from the fact that they are likely to approximate in price to take-over levels during the next few months, they have speculative possibilities in the hope that the final dividends may contain a number of pleasant surprises.

There was a steadier tendency in Argentine rails, which however failed to attract more than very limited attention, although prices are well below the share-out levels with the 4 per cent. debentures now mostly 9 points discount to the latter, or about a point better in price than a week ago. Buenos Ayres Great Southern 5 per cent. preference at 60 would seem to be particularly undervalued, the share-out price being 75, or 15 points above the current market price. Ordinary shares of the Argentine railways moved fractionally, buyers tending to come in on any decline. If, as is being generally assumed, there were an official statement from Buenos Aires that the railway deal will be formally ratified without any qualifications or amendments, there would be a general advance in Argentine railway stocks.

Elsewhere, Central Uruguay at 16¼ have turned firmer. San Paulo ordinary stock remained under the influence of absence of news as to when the compensation moneys in respect of the sale of the railway are to be received by the company. As a result of moderate selling the market price of the stock dropped sharply to 138, which, however, is considered to be well below the break-up value; other Brazilian rail stocks were only moderately lower. Antofagasta issues lost a little ground, but in other directions Canadian Pacifics strengthened to 16⅛.

Traffic Table and Stock Prices of Overseas and Foreign Railways

	Railways	Miles open	Week ended	Traffic for week: Total this year	Traffic for week: Inc. or dec. compared with 1945/46	No. of Week	Aggregate traffics to date: Totals 1946/7	Aggregate traffics to date: Totals 1945/6	Aggregate traffics to date: Increase or decrease	Shares or Stock	Prices: Highest 1946	Prices: Lowest 1946	Prices: Sept. 2, 1947
				£	£		£	£	£				
South & Central America	Antofagasta	834	24.8.47	49,550	+ 17,640	34	1,388,560	1,089,740	+ 298,822	Ord. Stk.	11	10¼	10½
	Arg. N.E.	753	23.8.47	ps.329,700	+ ps.24,400	8	ps.2,440,600	ps.2,504,800	– ps. 64,200	,,	17	5	10
	Bolivar	174	July, 1947	$98,317	– $9,349	30	$773,180	$760,024	+ $13,156	6 p.c. Deb.	6½	5½	19½
	Brazil	—	—	—	—	—	—	—	—	Bonds	30	26	31
	B.A. Pacific	2,771	23.8.47	ps.2,625,000	+ ps.600,000	8	ps.19,175,000	ps.17,013,000	+ ps.2,162,000	Ord. Stk.	8½	5½	9½
	B.A.G.S.	5,080	23.8.47	ps.3,432,000	+ ps.265,000	8	ps.26,481,000	ps.26,203,000	+ ps.278,000	Ord. Stk.	16	10½	16
	B.A. Western	1,924	23.8.47	ps.1,355,000	+ ps.6,000	8	ps.10,392,000	ps.9,411,000	+ ps.981,000	,,	19	9½	20
	Cent. Argentine	3,700	23.8.47	ps.3,417,250	+ ps.279,080	8	ps.25,378,605	ps.24,687,055	+ ps.691,550	,,	10½	7½	17
	Do.	—	—	—	—	—	—	—	—	Dfd.	6	4½	11½
	Cent. Uruguay	970	23.8.47	35,353	+ 2,946	8	261,101	277,833	– 16,732	Ord. Stk.	8½	3½	16½
	Costa Rica	262	June, 1947	34,128	+ 8,679	52	356,876	344,680	+ 12,196	Stk.	15	12	10
	Dorada	70	July, 1947	33,000	– 2,100	31	212,800	221,375	– 8,575	1 Mt Deb.	102½	99½	108
	Entre Rios	808	23.8.47	ps.451,800	+ ps.10,600	8	ps.3,367,600	ps.3,386,700	– ps. 19,100	Ord. Stk.	9	5½	9½
	G.W. of Brazil	1,030	23.8.47	25,700	+ 500	34	1,067,700	928,700	+ 138,900	Ord. Stk.	26/6	20/–	3½
	Inter. Ctl. Amer.	794	June, 1947	$1,002,064	+ $199,162	26	$6,902,843	$5,657,516	+ $1,245,327	—	—	—	—
	La Guaira	22¼	July, 1947	$100,778	– $27,921	30	$785,160	$822,241	– $37,081	5 p.c. Deb.	70	58	83¼xd
	Leopoldina	1,918	23.8.47	72,319	+ 1,206	34	2,227,765	1,942,778	+ 284,987	Ord. Stk.	5	3¼	11½
	Mexican	483	31.5.47	ps.1,464,000	+ ps.459,100	22	ps.7,706,200	ps.13,441,600	+ ps.5,220,000	Ord. Stk.	1¼	¼	1
	Midland Uruguay	319	July, 1947	15,947	– 3,037	4	15,947	18,984	– 3,037	—	—	—	—
	Nitrate	382	15.8.47	10,081	+ 2,750	32	145,136	135,362	+ 9,774	Ord. Sh.	83/9	71/3	72/6
	N.W. of Uruguay	113	July, 1947	3,987	– 716	4	3,987	4,703	– 716	—	—	—	—
	Paraguay Cent.	274	25.7.47	₲75,097	+ ₲15,672	4	₲202,849	₲228,044	– ₲25,195	Pr.Li.Stk.	78½	60	44½
	Peru Corp.	1,059	July, 1947	162,690	+ 11,788	4	162,690	150,902	+ 11,788	Pref.	16½	8¾	8½
	Salvador	100	June, 1947	c91,000	+ c11,000	52	c1,699,000	c1,597,450	+ c101,550	—	—	—	—
	San Paulo	153½	—	—	—	—	—	—	—	Ord. Stk.	119½	52½	140½
	Taltal	156	July, 1947	5,585	+ 1,790	4	5,585	3,795	+ 1,790	Ord. Sh.	22/6	15/3	17/–
	United of Havana	1,301	16.8.47	60,774	+ 7,894	7	424,756	379,740	+ 45,016	Ord. Stk.	2	1¾	2
	Uruguay Northern	73	July, 1947	1,072	– 58	4	1,072	1,130	– 58	—	—	—	—
Canada	Canadian National	23,535	July, 1947	9,507,250	+ 896,000	30	62,567,500	55,150,500	+ 7,417,000	—	—	—	—
	Canadian Pacific	17,037	21.8.47	1,481,750	+ 82,250	33	49,145,250	45,080,500	+ 4,049,750	Ord. Stk.	25½	16¼	16
Various	Barsi Light†	202	July, 1947	34,095	– 2,220	18	114,300	109,700	+ 4,600	Ord. Stk.	123½	111	110½
	Beira	204	June, 1947	99,433	+ 20,525	37	828,897	676,166	+ 152,731	—	—	—	—
	Egyptian Delta	607	20.8.47	16,791	– 887	15	179,814	181,642	– 1,728	Prf. Sh.	9¼	5	6
	Manila	—	—	—	—	—	—	—	—	B. Deb.	75	60	71¼
	Mid. of W. Australia	277	June, 1947	16,351	– 329	52	202,351	208,970	– 6,619	Inc. Deb.	85	70	75
	Nigeria	1,900	June, 1947	311,524	– 47,389	13	3,700,591	3,950,664	– 250,073	—	—	—	—
	Rhodesia	2,445	June, 1947	569,518	+ 35,926	37	4,978,485	4,600,382	+ 378,103	—	—	—	—
	South African	13,323	2.8.47	1,279,273	+ 104,115	18	21,952,849	19,475,681	+ 2,477,168	—	—	—	—
	Victoria	4,774	May, 1947	989,352	– 361,928	48	—	—	—	—	—	—	—

† Receipts are calculated @ 1s. 6d. to the rupee